

**MULTI-  
COMPARO**  
ISSUE

**HOW TO: DIAL IN YOUR SUSPENSION**

# **SPORT Rider**

**MAGAZINE**



**DUCATI MULTISTRADA  
1200 S**



**BMW  
S1000 XR**



**KAWASAKI  
NINJA 1000 ABS**

**VS.**



**SUZUKI  
GSX-S1000F ABS**

**APRILIA RSV4 RF VS.  
YAMAHA R1M**





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# HOT SHOT

## EVENT

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## PHOTOGRAPHER

Gold & Goose

After six rounds of the 2015 World Supersport series on a Kawasaki, American PJ Jacobsen switched to the Core Motorsport Thailand Honda team. He finished third in the next race in Portugal, second two weeks later in Misano (shown here), and became the first American to win a World Supersport race with a win at the next round at Sepang in Malaysia.





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BY KENT KUNITSU

## WHEEL SPIN



# THE BUELL SAGA CONTINUES

Erik Buell Racing may rise from the ashes of its shutdown in April 2014 after remaining EBR assets are purchased by New Jersey entrepreneur

PHOTOGRAPHY BY TOM RILES

**Y** It's been quite the bumpy road for Erik Buell lately. In 2009, as part of a number of cost-cutting measures Harley-Davidson shut down the maverick designer's Buell Motorcycle Company, after purchasing the majority ownership back in 1998. Resurfacing on the motorcycle landscape as Erik Buell Racing in 2011, Buell signed a minority ownership agreement the following year with Indian motorcycle giant Hero MotoCorp that gave his company a massive cash infusion in exchange for development of numerous new models for Hero. The 2013 AMA Superbike season saw EBR field a superbike team on its 1190RX V-twin, which soon expanded to an entry into the 2014 World Superbike season.

But then the harsh realities of the cutthroat financial world forced EBR to abruptly shutter its factory doors and file for receivership protection from creditors in April 2014. Hero's contract for new-model R&D consultant work with EBR was reportedly around \$25 million, and according to reliable sources, the Indian OEM started withholding payments that soon forced EBR into a cash crunch it couldn't extricate itself from. This after EBR engineers had created numerous new models for Hero that displayed a level of innovative and creative design never before seen from the Indian manufacturer (or the Indian market, for that matter).

To add insult to injury, Hero was able to basically loot still-in-progress R&D consultancy assets

from the company it had forced into bankruptcy after negotiating with the Wisconsin receivership courts to buy those assets for \$2.8 million prior to the receivership auction. Those assets did not include the EBR engineers responsible for that work; reliable sources also tell us that although Hero offered each now-unemployed engineer big money to work for the Indian company, all propositions were said to have been less-than-respectfully declined.

When the receivership auction finally took place in August, the question of whether the remaining company assets were going to be sold as a whole or piecemeal (as ignominiously happened to the Buell Motorcycle Company) was answered when it was reported that the winning bidder was a New Jersey entrepreneur whose stated intention is to resurrect the EBR company and retain Erik Buell as its president. Buell fans across the nation rejoiced.

It won't be a smooth and effortless road back to life for EBR though. Getting the factory and production lines staffed and running again shouldn't be that difficult, but the question of gaining back the confidence of the parts suppliers, the dealers, and especially consumers certainly won't be easy. For example, any parts vendors who were owed money for components likely had to absorb some losses as part of the bankruptcy settlement, and they'll surely be asking for some assurances before delivery from now on.

But the bigger question resides with the dealers and consumers. EBR's dealer network was/is fairly small, and there were surely some nervous times before the company resurrection announcement regarding how they were going to support those bikes they'd already sold with spares and warranty work. Having the rug pulled out from under you twice can be a disconcerting history to think about when it comes time to order any new floor units. Granted, reassuring the remaining dealers is one of the first tasks the new owner has stated he will work on.

The most important factor, of course, will be the consumers. While the Buell faithful are a vocal and supportive bunch, the actual number of bike sales is still rather small in comparison to even the European brands. The new owner has made statements regarding EBR getting sidetracked with its consultancy work for Hero and that it needed to return to concentrating on its core consumer base (ironically, a similar statement was made by Harley-Davidson management in explaining the cost-cutting measures that resulted in the shutdown of Buell Motorcycle Company). Getting more people interested in the EBR brand will require a lot more than just two models that are priced on the higher end of the market scale.

Here's hoping that the third time's a charm for a motorcycle company with the Buell name. It would be a shame to see that part of his legacy to end yet again on a dour note. **SR**



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BY ANDREW TREVITT



## STOPWATCH

# LEARNING CURVE

A busy summer looking at data

PHOTO BY PETER TREVITT

**Y** As I have written about several times over the past few years, I have been doing a lot of work with data acquisition and how it relates to chassis setup and riding skills. This past summer, I again worked with the Honda Canada/Accelerated Technologies team and rider Jodi Christie, who competes in the Mopar Canadian Superbike Championship in the Superbike and Sport Bike classes.

In 2014, Jodi won the Mopar Superbike championship and finished second in the Hindle Exhaust Sport Bike series. Target on our back, we expected a lot of competition for 2015; Honda Canada upped its commitment to the team by providing the SP model of the CBR1000RR, and John Sharrard, who builds the bikes and is Jodi's crew chief at the track, worked hard to find as much power in the bikes as he could. (The rules in the CSBK series include horsepower limits, but they are such that it is very difficult to reach those numbers on the Hondas without reliability issues.) As for my part, I spent the winter poring over data and came up with what I hoped were solutions to a couple of chassis issues we had encountered over the season.

On the positive side, we made some big steps this season. The bikes were faster and worked better, with the issues that I had hoped to resolve fixed. Jodi's riding kept improving, and

lap times were quicker. On the negative side, Jodi's main competition for the Superbike title—Jordan Szoke—also made big steps from one year to the next; the 2015 BMW S 1000 RR is significantly improved from the 2014 model in race trim, evidently. The two riders pushed each other hard through the season, but a couple of crashes dropped Jodi to third in Superbike points while Jordan wrapped up his 10th Superbike championship.

It was a difficult season, but as I have pointed out in a previous column ("Trackdays or Go Racing?" Sept./Oct. '15) and many times before, it's competition that drives us all to work harder and improve. For sure if Jodi was winning races and championships easily, I wouldn't be going bug-eyed looking at data for hours on end, John and the rest of the team wouldn't be up until all hours in the shop and at the track working on the bikes, and Jodi wouldn't be so intent on improving his riding every time he goes out. For sure our goal—as it is for any race team—is to win, and it would be a lot less stressful if the wins came easy, but at the same time I know that I am learning more than I would be if they were.

What did I learn this season, then? When I first started looking at data, I rarely looked at the suspension channels for more than basic information: Is the fork or shock topping or bottoming? Are the spring rates in the ballpark?

But as time goes on and I learn more about the subtleties of suspension and chassis setup, I look at that data more and more. My big lesson from this year was just how accurate all that information—and the setup—needs to be. A rider of Jodi's caliber can feel a difference of just a few millimeters in ride height and how that affects rake, trail, center of gravity, anti-squat, and more. Extrapolate that as the suspension moves in its stroke, and it's clear that spring rates, preload, linkages, and damping must all be equally as precise. At the beginning of the year, all my suspension charts—which calculate load, wheel rate, linkage ratio, and so on—were based on increments of 2mm of travel. Halfway through the year I had to change them all to 1mm increments to properly determine some aspects of setup that we were looking at.

I learned plenty more as well, some of which you can read about in my setup article elsewhere in this issue ("The Perfect Setup," page 42) and in the other articles I've written in the last few issues. It was a busy summer, but it's looking like the winter will be just as busy for me: If we are going to challenge for wins and the championship in 2016, we will have to make another step forward, and that means going through the mountains of data I have from this year to find any possible advantage that I can for Jodi and the team. **SR**





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## MAILBOX | READERS FIRE BACK

### LETTER OF THE MONTH

#### WHAT BMW R1200R TEST?

I just got through reading *Sport Rider's* "First Ride" on the BMW R 1200 RS in the October/November 2015 issue, and in the article there are references made toward the BMW R 1200 R, "reviewed elsewhere in this issue," and "as with the R 1200 R also reviewed in this issue." Am I missing something? I cannot find the BMW R 1200 R review anywhere in this issue. Am I missing some pages?

Scott Wohrman  
Coral Springs, FL

*Um, whoops... That's what happens when you are forced to hold a story over at the last minute because of space problems in a particular issue of the magazine. The BMW R 1200 R First Ride story will appear in a future issue. Apologies for the oversight.*

*Mr. Wohrman has earned himself a pair of brand-new Sidi Apex boots from the great people at Motonation. A sort of "low-cut" version of Sidi's excellent sport/racing boots, the Apex is manufactured primarily from Technomicro, a*



*synthetic leather material, and still features Sidi's patented Vertebra System protecting the rider's Achilles tendon, replaceable thermoplastic ankle and shock-absorbing heel cup protection, and adjustable nylon toe skids. Perforated Teflon-treated nylon inner liner, a nylon inner sole with removable support pad, and dual-compound sole ensure comfort. The Apex comes in sizes 7.5-13 (Euro sizes 41-48), in all black or white/black, and retails for \$225. For more info, log onto motonation.com. —Ed.*

#### WHAT HAPPENED TO THE PANIGALE MIRRORS?

I just finished reading your "Best Yet" article of the new sportbikes in the August/September 2015 issue. Just out of curiosity, why did you remove the mirrors and fender on the Ducati yet keep them on the BMW and R1? By the way, I loved the article and your choice of words. Oh, and I found the mother-approved words to describe the R1: guided missile. At least that's what I say when people ask me about mine.

Kelly Sweet  
Los Angeles, CA

*The reason the Ducati was missing its mirrors and license plate hanger was because that's how Ducati reps delivered it to the track portion of our test where we shot the photos. Timing for our test was incredibly tight with regard to other publications' comparison tests, and the reps had to drive all night to get the 1299 Panigale S over to the track the day of our test. Since we had a packed schedule of riding ahead running in conjunction with a trackday organization—plus the fact that the Ducati reps were dog-tired—we figured it was a minor detail that could be overlooked. —Ed.*

#### DECREASING OFFSET = INCREASING TRAIL

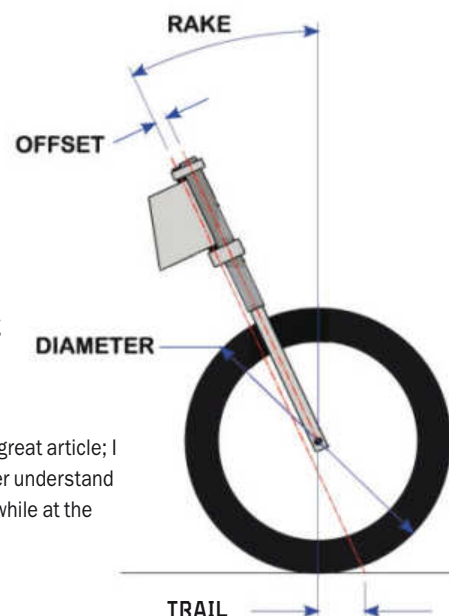
First off, thank you very much for the article on geometry. It was one of the most educational and beneficial articles I have read in *Sport Rider* in a long time. Like the article said, references are made to aspects of geometry all the time, and most people don't know why it matters (I was definitely in this camp).

While reading, re-reading, and re-reading again so I could comprehend all this newfound wisdom, I was struggling with one point. In the section "Front Geometry: Rake And Trail," the second paragraph states,

"decreasing offset will add trail." Is this a typo and supposed to say, "increasing offset will add trail"? If I'm understanding it all correctly, increasing the offset will push the forks (and the tire's contact patch) away from the steering axis line, thereby adding trail? Please clarify this for me before my head explodes!

Thanks again for the great article; I can now use this to better understand how my bike is handling while at the track.

Derek Capps  
Fort Worth, TX



Steering trail is the distance between a line drawn directly through the steering head and a line drawn vertically from the front axle, measured at the ground. You'll note that the tire's contact patch is behind the steering head axis, not in front of it. Thus, if you decrease fork offset (pulling the fork tubes back closer to the steering head), you increase trail because you are moving the tire's contact patch rearward and farther away from the steering head axis.

*This is how an instability problem with the original '93 Honda CBR900RR*



was solved. When racers testing a CBR900RR project bike preparing for the WERA 24 Hour Endurance race at Willow Springs in 1993 complained of instability and lack of front-end feel through the track's vaunted 145-mph turn eight, crew chief (and noted local SoCal tuner) Kaz "Dude" Yoshima discovered that the CBR lacked enough steering trail, even with the 17-inch front wheel the racers were using (the early CBRs came with 16-inch front wheels; using a larger-diameter front tire adds trail). He designed and machined a set of triple clamps with less offset which cured the problem. Honda eventually adopted that same concept with the later model CBR929RR and CBR954RR. —Ed.

### HONDA RC213V-S

I find it incredible that after years of the same old thing dressed up with different paint and other simple doodads, instead of offering a new CBR1000RR that the everyday person can afford, Honda instead chooses to introduce a bike that only the ultra-wealthy can buy. And to top it all off, it only puts out 101 hp in USA form, and you have to go elsewhere to buy the race kit (that also makes it non-street-legal). It's pretty easy to see

how Honda views sport-bike enthusiasts here; we're only minions to mine profit out of. I've been a Honda guy all my life, and I was holding out thinking that a new CBR was coming, but I've already put my deposit down on a new R1. Goodbye, Honda. Jason Mulaney  
Durham, NH

Seriously, Honda? That's the best you can do? A \$184,000 POS that only some rich guy can afford and will just put in his living room to show off? No wonder I hardly see any CBRs on the street anymore, except some old CBR that looks like it's been put together with duct tape and baling wire, and being ridden by some guy with a way old helmet. Oh, how the mighty have fallen.

Marcus Falcone  
Concord, CA

Why all the hating on Honda in the editor's *Wheelspin* column? No advertising from Big H



lately? So a major factory finally builds a MotoGP bike for the street, and all you can do is harp on the horsepower limits and the price. Last I heard, MotoGP technology like that isn't cheap.

Steve Harris  
Atlanta, GA

No, MotoGP technology usually isn't, and yet Yamaha has been offering an electronics package on the latest R1 that is the closest thing yet that any manufacturer has ever offered and for a tiny fraction of the RC213V-S's asking price. —Ed.



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**COMPARISON**

2016 RSV4 RF VS. 2015 YZF-R1M

# ELECTRONIC WAR

## MOTOGP-INSPIRED ELECTRONICS CLASH AS APRILIA'S UPGRADED RSV4 RF MEETS YAMAHA'S LIMITED-PRODUCTION YZF-R1M

BY KENT KUNITSUGU PHOTOGRAPHY BY DREW RUIZ

In our last literbike comparison test ("Best Yet," Aug./Sept. 2015), many readers were bemoaning the absence of the new 2016 Aprilia RSV4, which had actually undergone a good number of upgrades. Unfortunately, as we stated in the test, Aprilia USA simply didn't have one available in time for our test, and we decided it was more important to get that test done than hold everything up.

Lucky for us, right at the time Aprilia told us an RSV4 RF was available ("Heroes Made Here," Aug./Sept. 2015), Yamaha also called and said one of the limited-production YZF-R1M models was available ("Raising The Bar," June/July 2015). Well, whaddya know? Two of the latest high-end versions of these superb supersport machines—might as well pit them together, no? We've already covered the tech details of each bike in the aforementioned First Ride stories, so let's just cut to the chase, shall we?





# FABE






**TEST NOTES**  
**APRILIA RSV4 RF**

|   |                                                         |
|---|---------------------------------------------------------|
| + | Major power improvement                                 |
| + | Excellent chassis                                       |
| + | Superb brakes                                           |
| - | Electronics not as good as R1M                          |
| - | Dash looking a little dated                             |
| x | Location of nearest Aprilia dealer will be major factor |

**SUGGESTED**  
**SUSPENSION SETTING**

|               |                                                                                                                                                                              |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Front:</b> | Ride height-3 lines showing; spring preload-7.25 turns out from full stiff; compression damping-13 clicks out from full stiff; rebound damping-11 clicks out from full stiff |
| <b>Rear:</b>  | Ride height-stock; spring preload-147.5mm measured spring length; compression damping-15 clicks out from full stiff; rebound damping-13 clicks out from full stiff           |

## Track

In order to truly let these two literbikes stretch their legs, we took the Aprilia and Yamaha to the high-speed confines of Willow Springs International Raceway's big 2.5-mile, nine-turn road course and cut them loose. With major elevation changes and average lap speeds well over 100 mph that include the daunting 145-mph turn eight, Willow Springs not only shows who's got the horsepower but also who's got the complete handling package. We also fitted both bikes with Dunlop's latest Sportmax GP-A Pro DOT race tires (see page 18) to keep the grip quotient consistent.

Right away we were shocked at the difference between the previous-generation RSV4 and the 2016 model. To put it bluntly, the new Aprilia is an absolute rocket ship. Whereas the previous RSV4 would come off the corners hard with a strong midrange only to fall disappointingly flat on top, the new Aprilia simply continues charging down the straight with a ferocity that has you scrambling to bleed off that speed into the next corner. Aprilia's press materials for the new RSV4 mentioned some engine changes, but unlike some of the other 2016 models, there was no indication of the huge increase in horsepower we experienced. Throttle response is fairly smooth in all three riding modes, allowing you to get on the power early and make good use of the V-4 engine's broad spread of power.

In the company of a beefy powerplant like the Aprilia, the R1M's engine definitely feels a little down on power. But don't be fooled by the dyno charts; the Yamaha still comes off the corners nearly as hard and carries a truckload of speed

down the straights, despite spotting the RSV4 about 7 hp up top. Like the standard R1, the crossplane-crankshaft engine is deceptive in how it builds speed; there are gobs of midrange power coupled with a very quick-revving character that gets you into the next corner a lot quicker than you expect.

Much of the Yamaha's ability to get off the corners quickly and carry that momentum down the straight despite the power deficit is due to its superb electronics package. While the Aprilia aPRC system controls rear tire spin and wheelies well for the most part, it simply cannot match the Yamaha system's consistency and ability to manage a slide while maintaining the bike's forward drive. Add to that the breadth of adjustability (and the intuitive settings menu) of the R1M, and you have a combination that's tough to beat.

About the only flaw with the Yamaha's powerplant (or actually, the electronics) is an overly aggressive throttle response in Power Mode 1. As we mentioned in last issue's evaluation of the FT ECU reflash ("A Flash of Brilliance," Oct./Nov. 2015), even pro racers feel that the Power Mode 1 throttle response is abrupt, so that should tell you something. Thankfully, the throttle response in Power Mode 2 is much smoother, and only the first 10 percent or so of throttle movement is different than Power Mode 1; everything else is identical.

Both the Aprilia and Yamaha displayed outstanding handling qualities, with our testers having a difficult time deciding which one they liked best. Both chassis provided excellent feel and stability through any type of situation on the track we encountered, though each one had its

strong points. For example, the R1M felt more agile than the RSV4, which required more effort to flick through fast transitions (though the data showed that the Aprilia was quicker going from side to side in Willow's tighter sections). Meanwhile, most testers felt the Aprilia had a slight edge in stability and front-end feel under braking—a good thing, considering its Brembo M430 calipers and 320mm discs setup provided outstanding stopping power. And yet some testers felt the Yamaha provided slightly better chassis feel while leaned over and then accelerating out of a turn.

Suspension feel and action provided an interesting contrast between the electronically controlled semi-active Öhlins suspension of the R1M and the "standard"-spec Öhlins components of the Aprilia. It was difficult to fault the RSV4's suspension, which provided excellent control in nearly all situations we encountered on the track (and street as well). Meanwhile, although the Yamaha's electronic Öhlins fork and shock



The Aprilia's Brembo M430 aluminum monoblock calipers and 320mm discs make up one of the best front brake systems we've ever tried. Öhlins suspension provides outstanding chassis control.





#### TEST NOTES YAMAHA YZF-R1M

|   |                                                         |
|---|---------------------------------------------------------|
| + | Outstanding electronics package                         |
| + | Excellent chassis                                       |
| + | Quick-revving, strong engine                            |
| - | Brakes could be better                                  |
| - | Could use a little more top-end power                   |
| - | Electronic suspension good but not great                |
| x | Y-TRAC is an excellent app that adds to the R1M's value |

worked well for the most part, when pushed hard, we couldn't get past a distinct feeling of the suspension changing in situations where it wasn't expected (something we also experienced on Ducati's similarly suspended 1299 Panigale S). While very subtle, it was enough to sap confidence ever so slightly at crucial times where that trust must be absolute.

As with the Ducati, the electronic Öhlins suspension on the R1M can be switched to manual settings that omit the semi-active damping control. Doing so with the R1M proved that semi-active electronic suspension still needs a little bit of fine-tuning before it's really ready for prime time, as the Yamaha felt more natural in the manual settings and enabled Associate Editor Bradley Adams to set his quickest lap times. While we continue to marvel at the advances in electronics, it's nice to have the choice to opt out if desired.

While the R1M's Advics front calipers and 320mm discs are more than adequate for the task of apex strafing at 10/10ths on the race-track, they pale in comparison to the top-shelf Brembo setup on the Aprilia. Power, feel, and modulation with the forged-aluminum monoblock M430 calipers is outstanding, and when combined with the 320mm discs, there's plenty of capability to bleed off the tremendous speed the RSV4's engine builds up. And as far as the antilock brake systems on the Aprilia and Yamaha, we were very impressed with both setups; both are adjustable, and activation and application were transparent enough that you rarely felt them working even under very

aggressive braking.

Incidentally, we also got the opportunity to try the Yamaha's optional Y-TRAC system that gives you both datalogging and suspension setting change capability via the smartphone/tablet app. We were impressed with the app's intuitive interface and datalogging capabilities and found it a useful tool to discover details about your bike and your riding you wouldn't find any other way.

### Street

It's pretty obvious that the Aprilia and Yamaha take the "racebike toned down for the street" design philosophy to the extreme—so you wouldn't expect a lot of compromises for the street rider—and neither bike disappoints. For example, the close-ratio transmissions on the RSV4 and R1M both have tall first gears, requiring a good bit of clutch slipping if you want to get off the line swiftly. The seats on both bikes were designed more with track use in mind—the Yamaha especially—so they will have you squirming around after just 20 minutes of highway droning.

While the Yamaha's ergonomic package is supreme for the track, it's harsher on the street, with a longer reach to the bars than the Aprilia; conversely, there's a bit more legroom with the R1M. Wind protection from the Yamaha's fairing is better than the RSV4, though that could be due to the rider's torso leaning farther forward and not being as upright as it is on the RSV4 RF, due to that bike's taller-for-2016 clip-ons. Fuel mileage with the R1M is decidedly poor, with an average of 29 mpg, meaning you'll be looking for a gas

station at the 125-mile mark.

Interestingly, the Aprilia's standard Öhlins suspension has better compliance over minor bumps and highway imperfections than the R1M's electronic Öhlins pieces. Even with its damping adjusted to softer settings, the Yamaha doesn't seem to absorb the smaller stuff as well as the RSV4. Once in the canyons, however, both chassis/suspension packages worked extremely well, with each bike presenting various strengths; for example, R1M's agility allowed easy cornering line changes, while the Aprilia's brakes and front-end stability stole the show on corner entries. The RSV4's stock Pirelli Diablo Supercorsa SP rubber was definitely superior to the Yamaha's OEM-spec Bridgestone Battlax RS-10 tires, yet the R1M's better part-throttle acceleration and quick-revving nature felt like you were exerting less effort out of turns than the Aprilia. The preference would swing back and forth depending on which bike each tester had just ridden.



The R1M's TFT dash readout is nicely laid out, with the Track setting showing only the important info for racetrack usage. For example, note that the tach starts at 8,000 rpm (no reason you'd go any lower than that except in the pits).



# ELECTRONIC WARFARE

| SPECS             |                                                                                                                       |                                                                                                                                            |
|-------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Bike              | '16 Aprilia RSV4 RF                                                                                                   | '15 Yamaha YZF-R1M                                                                                                                         |
| MSRP              | \$21,999                                                                                                              | \$21,990                                                                                                                                   |
| ENGINE            |                                                                                                                       |                                                                                                                                            |
| Type              | Liquid-cooled, DOHC V-4, 4 valves/cyl.                                                                                | Liquid-cooled, DOHC inline-four, 4 valves/cyl.                                                                                             |
| Displacement      | 999.6cc                                                                                                               | 998cc                                                                                                                                      |
| Bore x stroke     | 78.0 x 52.3mm                                                                                                         | 79.0 x 50.9mm                                                                                                                              |
| Compression ratio | 13.6:1                                                                                                                | 13.0:1                                                                                                                                     |
| Induction         | Marelli EFI, 48mm throttle bodies, dual injectors/cyl.                                                                | Mikuni EFI, 45mm throttle bodies, dual injectors/cyl.                                                                                      |
| CHASSIS           |                                                                                                                       |                                                                                                                                            |
| Front suspension  | Öhlins 43mm inverted fork, adjustments for spring preload, compression, rebound damping, 4.7-in. travel               | Öhlins 43mm inverted electronically adjustable fork, adjustments for spring preload (manual), compression, rebound damping, 4.7-in. travel |
| Rear suspension   | Öhlins monoshock w/ piggyback reservoir, adjustments for spring preload, compression, rebound damping, 5.1-in. travel | Öhlins monoshock w/ piggyback reservoir, electronic adjustments for spring preload (manual), compression, rebound damping, 4.7-in. travel  |
| Front tire        | 120/70ZR-17 Pirelli Diablo Supercorsa SP                                                                              | 120/70ZR-17 Bridgestone Battlax RS-10FG                                                                                                    |
| Rear tire         | 200/55ZR-17 Pirelli Diablo Supercorsa SP                                                                              | 200/55ZR-17 Bridgestone Battlax RS-10RG                                                                                                    |
| Rake/trail        | 25°/105mm (4.1 in.)                                                                                                   | 24°/102mm (4.0 in.)                                                                                                                        |
| Wheelbase         | 56.9 in. (1445mm)                                                                                                     | 55.3 in. (1405mm)                                                                                                                          |
| Seat height       | 33.2 in. (844mm)                                                                                                      | 33.7 in. (855mm)                                                                                                                           |
| Fuel capacity     | 4.9 gal. (18.5L)                                                                                                      | 4.5 gal. (17L)                                                                                                                             |
| Weight            | 460 lb. (209kg) wet; 431 lb. (196kg) dry                                                                              | 444 lb. (201kg) wet; 417 lb. (189kg) dry                                                                                                   |
| Fuel consumption  | 32-39 mpg, 33 mpg avg.                                                                                                | 27-34 mpg, 29 mpg avg.                                                                                                                     |
| PERFORMANCE       |                                                                                                                       |                                                                                                                                            |
| Quarter-mile      | 10.40 sec. @ 146.55 mph                                                                                               | 10.45 sec. @ 146.23 mph                                                                                                                    |
| Roll-ons          | 60-80 mph/3.08 sec.; 80-100 mph/2.86 sec.                                                                             | 60-80 mph/2.96 sec.; 80-100 mph/3.45 sec.                                                                                                  |



carbon fiber in the sidewalls (like the Q3 sport tire) for improved stiffness, N-Tec radial construction and Jointless Tread design, continuously wound Jointless Band aramid-fiber belts and hex-bead construction, plus a bi-directional tread design for the rear that allows the tire to be "flipped" for longer life at certain tracks.

The Sportmax GP-A Pro tires provided excellent grip (that was consistent through most of the tread life) and quick steering characteristics, especially during initial turn-in. Bump absorption while leaned over was good, though the sidewalls definitely felt a little stiffer than other tires we've run. Overall handling manners during trail braking or heavy braking were ultra-stable, bolstering confidence entering corners.

For pricing and more information, go to [dunlopacing.com](http://dunlopacing.com).

Dunlop provided us with its latest Sportmax GP-A Pro DOT race tires for the track portion of our comparison. Featuring innovative tire construction technologies developed from the company's vast racing experience, the GP-A Pros utilize



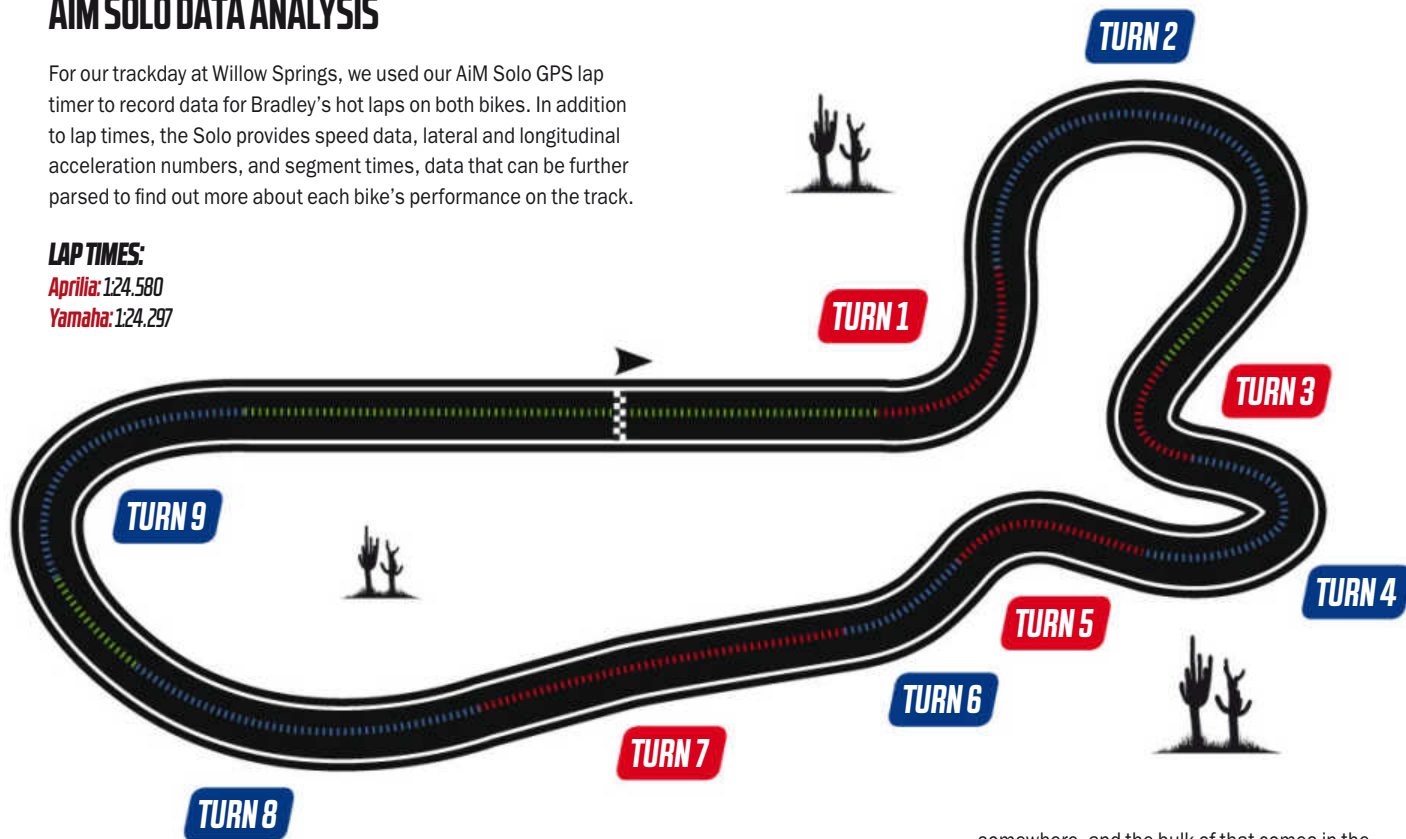
## AIM SOLO DATA ANALYSIS

For our trackday at Willow Springs, we used our AiM Solo GPS lap timer to record data for Bradley's hot laps on both bikes. In addition to lap times, the Solo provides speed data, lateral and longitudinal acceleration numbers, and segment times, data that can be further parsed to find out more about each bike's performance on the track.

### LAP TIMES:

**Aprilia:** 1:24.580

**Yamaha:** 1:24.297



While the R1M recorded the quickest lap on the day, there's really nothing in it between the two bikes; the RSV4 posted the quickest segment times in the majority of the 13 segments we've broken the track into, and if we were to take start/finish from somewhere between turns eight and nine rather than on the front straight, the Aprilia ran a lap even faster than the Yamaha's best.

Although the Aprilia has a significant top-end horsepower advantage over the Yamaha, even on a horsepower-hungry big track like Willow it does not pay off as you'd think. Maximum speeds on the front straight—the fastest section of the course—are approximately the same for each bike, with the RSV4 averaging a 157.5-mph top speed over its three hot laps, with the Yamaha at an average of 157.0 mph for its three laps. The R1M looks even more potent at speed when you consider apex speed in turn nine, which leads onto the front straight: Here, the Aprilia is averaging 95.0 mph, while the Yamaha is a chunk slower at 93.1 mph.

At other points on the track, the Yamaha's deceptive speed is also apparent: Between turns two and three, it reaches 122.1 mph compared with the Aprilia's 122.2 mph. And between turns seven and eight, the Yamaha gets to 149.0 mph compared with the Aprilia's 147.4 mph. "The R1M

seems to accelerate better under anything less than full throttle," Kento said. "It seems to rev quicker than the RSV4 and felt like it was getting from corner to corner (especially off the corners) in the tighter sections at least as well or even better than the Aprilia. Yes, the Aprilia definitely had the horsepower when you had the throttle pinned, but the Yamaha was surprising in how well it accelerated."

At the end of the front straight the Aprilia shows better overall braking power than the Yamaha, reaching a peak deceleration of 1.21 G compared with the Yamaha's 1.13 G. The RSV4 shows a similar braking advantage on other laps and in other corners, but again these numbers don't tell the whole story: The R1M shows more consistent deceleration through each braking zone, with the result that Bradley is able to use more trail braking and reach the apex of each turn more consistently. "The Aprilia's M50 Brembos were far superior to the Yamaha's brakes," Kento agreed. "Way more power, feel, modulation, et cetera. But I think that the R1M's brakes were adequate, and because they required a bit more effort at the back half of the braking zone, it was easier to modulate speed for entry. And the R1M felt like it had better front-end stability and feel in the transition between braking and throttle, at least for me."

The RSV4 must be making up time

somewhere, and the bulk of that comes in the slower turns three, four, and five making up the Omega section of the track. Through this section and including turn six over the hill onto the back straight, the Aprilia takes 25.161 seconds and posts the quickest times of the day in three of the segments, while the Yamaha takes 25.35 seconds. Notable here is that the Aprilia shows slightly better roll rates than the Yamaha, arcing from full lean to full lean quicker in each transition, one aspect that disagrees with Kento's notes: "Weird, the Yamaha definitely felt easier to flick side to side in the Omega," he writes. "The Aprilia required a lot more effort in the transitions; the R1M felt like a bicycle in comparison. Perhaps letting off the gas to load the Aprilia's front end helped stand up the bike to flick it over to the other side? I will say that the RSV4 was easy to steer once the initial steering input was dealt with."

Perhaps the biggest difference between the bikes and what shows the advantage of the Yamaha best is this: Looking at three laps for each bike, the Yamaha's GPS data—position, lean angle, lateral and longitudinal acceleration—for each lap is remarkably consistent to the point that many of the traces for the different laps appear identical; the GPS track maps for Bradley's three laps on the R1M, in fact, appear as almost a single line. In contrast, the Aprilia's traces are much less consistent over its three laps, both in terms of the riding line and the GPS data.



# ELECTRONIC WARFARE



The Advics four-piston calipers and Öhlins electronic suspension work well, but when really pushed, they're not quite up to the level of the Aprilia's components.

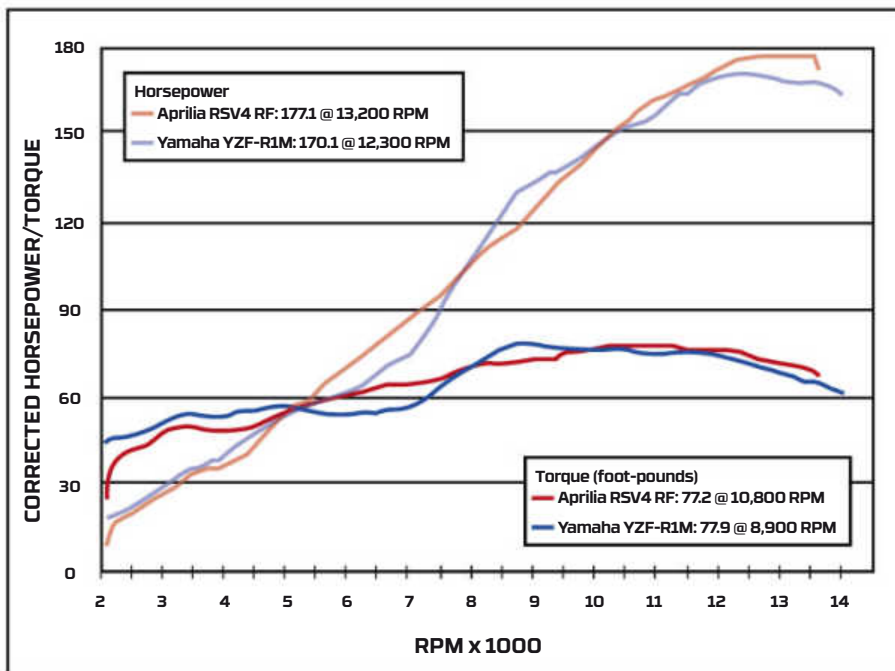
## So What'll It Be?

This comparison was definitely one of the tougher ones we've done. While dyno chart mavens will point at the Aprilia's 7-hp advantage, a look at the acceleration numbers and lap times shows the two are a lot closer in performance than a simple dyno-graph run at full throttle will show. Even the MSRP between the two is basically the same (the Aprilia is \$9 more expensive, so hopefully that's not a deal-breaker).

While two out of our three testers picked the Yamaha by a whisker, there is one other tangible subject that bears mentioning. Aprilia has had and continues to have great products, but its sales here in the US haven't reflected that design success. Much of that can be attributed to the small dealership network in the US, which itself is a result of the company's past history of poor dealer support (which some say has been fixed, while others disagree). It's likely that much of your buying decision will hinge upon the proximity of your nearest Aprilia dealer.

Whichever one you pick, you really can't go wrong with either one. **SR**

| RATINGS                |                 |                |
|------------------------|-----------------|----------------|
| Bike                   | Aprilia RSV4 RF | Yamaha YZF-R1M |
| Fun to ride            | 9               | 9              |
| Quality                | 9               | 9              |
| Instruments & controls | 8               | 9              |
| Ergonomics             | 9               | 9              |
| Chassis & handling     | 9               | 9              |
| Suspension             | 9               | 8.5            |
| Brakes                 | 9.5             | 9              |
| Transmission           | 9               | 9              |
| Engine power           | 9.5             | 9              |
| Engine power delivery  | 9               | 9.5            |
| Ratings total          | 90              | 90             |



Yes, the Aprilia has a smoother powerband and more peak power on the dyno, but interestingly things are a lot closer on the pavement. As usual, the dyno doesn't tell nearly the whole story.

## SPORT RIDER OPINIONS



### Kent Kunitsugu

Age: 54

Height: 5'8"

It's hard not to be seduced by the Aprilia's monster engine and outstanding chassis into thinking you're setting the racetrack on fire and leaving the Yamaha far behind. That Aprilia was able to extract nearly 20 more horsepower out of the RSV4 engine is a feat in itself and shores up a big weakness with the previous model. Add to that brick-wall brakes and excellent suspension, and you have a package that's hard to beat.

But while the Yamaha may feel slow in comparison to the RSV4 RF at the track, a look at the stopwatch shows otherwise. The R1M is a seriously well-balanced piece of equipment that simply gets the job done quietly and efficiently. Yes, the throttle response is still abrupt in Power Mode 1, and we did find it better to run the electronic suspension on manual settings when pushing hard, but the Yamaha's stunning electronics suite is otherwise faultless. And that includes the very impressive optional Y-TRAC app that practically precludes having to get an expensive datalogging system.

There's an Aprilia dealer not too far from my home, but I'd opt for the Yamaha regardless.



### Bradley Adams

Age: 26

Height: 6'3"

Choosing between two bikes is never easy, but this time around it feels downright impossible. How am I supposed to say the Yamaha R1M is a better motorcycle than the Aprilia RSV4 RF (or vice versa) when they both do basically nothing wrong on neither the track nor the street? These are the cream of the crop, and honestly I couldn't out-ride either. But, alas, the boss says I have to choose a winner, and so in the name of keeping my job, I'm making a choice. And that choice is the Yamaha.

Mind you, my decision isn't entirely based on performance. In fact, while I think the Aprilia actually outperforms the Yamaha in a few ways (front-end feel while trail braking, braking performance, fueling, etc.), I just don't see ownership being as enjoyable. I mean, I don't even know where my "local" Aprilia dealer is... On top of that, I think Aprilia cut a few corners by not updating a few important things like the dash and switch gear (small things, really), plus the electronics are still a few keyboard clicks behind.

The benefit here, of course, is that it doesn't matter if you like my decision or not. Pick either bike and you'll be happy. I guarantee it.



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# CHANGING ROLES

BY KENT KUNITSUGU PHOTOGRAPHY BY KEVIN WING

**KAWASAKI'S NINJA 1000 ABS IS SQUARE  
IN THE CROSSHAIRS OF SUZUKI'S NEW 2016  
GSX-S1000F ABS—DOES IT HIT THE MARK?**

When we last tested Kawasaki's Ninja 1000 ("With A Sporting Intent," Dec. 2014), the second-generation version of Team Green's 1,043cc sport-tourer basically had no competition, offering up a combination of midrange-strong power, amiable handling, and decent comfort that was hard to beat. Add a set of Kawasaki's excellent accessory hard saddlebags, and you had yourself a superb travel companion.





Since that time, though, some changes have occurred on the sport-touring landscape. First, the newer, pavement-oriented “adventure-sport” genre of ADV bikes (such as the Ducati Multistrada 1200 S and BMW S 1000 XR tested elsewhere in this issue) are essentially crowding into the role that used to be the sole turf of sportbikes like the Ninja 1000, in both the consumers’ and manufacturers’ eyes. The introduction of Kawasaki’s Versys 1000 in 2015 (“The More, The Merrier,” April/May 2015) is a perfect case in point. While the Versys 1000 LT comes standard with hard bags, we couldn’t obtain a set of accessory

units for the 2015 Ninja 1000, and we got the distinct impression from Kawasaki that the company didn’t want to promote that option for the bike (this despite components on the rear being tailor-made for the accessory bags). With sales of the ADV bikes still strong, you can be sure that the sport-touring waters will only get muddier as time passes.

But perhaps more important is that the Ninja 1000 ABS finally has some direct competition in the new 2016 Suzuki GSX-S1000F ABS. One of a trio of new liter-size GSX-S models—the GSX-S1000F ABS, the GSX-S1000 ABS, and the GSX-S1000—the GSX-S1000F’s full fairing and sport-touring windscreen make it the perfect rival to the Kawasaki.



# CHANGING ROLES



## TEST NOTES SUZUKI GSX-S1000F ABS

|   |                                       |
|---|---------------------------------------|
| + | Good engine, agile handling           |
| + | Great ergos, nice brakes              |
| - | Slightly abrupt throttle response     |
| - | Needs better range                    |
| x | A surprisingly good bang for the buck |

## SUGGESTED SUSPENSION SETTING

|               |                                                                                                                                              |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Front:</b> | Spring preload-8 turns out from full stiff; rebound damping-10 clicks out from full stiff; compression damping-14 clicks out from full stiff |
| <b>Rear:</b>  | Spring preload-15mm thread showing on shock body; rebound damping-8 clicks out from full stiff                                               |

### Suzuki Tech Details

Both the GSX-S1000F ABS (which we tested) as well as the standard and non-ABS naked GSX-S1000 models (which are basically identical other than the headlights and the F model's fairing) utilize a 999cc DOHC inline-four based on the powerplant from the heralded "K5" 2005-2006 GSX-R1000, which was then a quantum leap forward for the model in performance. New pistons in the GSX-S that are 3 percent lighter drop the compression ratio a tad down to 12.2:1 from 12.5:1. A new cylinder head with revised intake and exhaust ports holds mellowers cams, all tuned for better midrange power. Those cams actuate stainless-steel valves instead of the ultra-light-but-expensive titanium valves on the GSX-R K5, and this results in a lower redline of 11,500 rpm versus the GSX-R's 13,500 rpm.

The new engine breathes through the same SDTV (Suzuki Dual Throttle Valve) 44mm throttle bodies as the GSX-R, though there is only one long-tip/10-hole injector per cylinder on the GSX-S rather than the GSX-R's dual injectors. Like the valves, the 4-into-2-into-1 exhaust on the GSX-S is made from stainless steel instead of the GSX-R's titanium makeup for cost reasons. The GSX-S's less aggressive intent means that while the transmission is basically the same as the GSX-R, the clutch omits the slipper function.

With rider aid electronics now de rigueur with current sportbikes, the GSX-S comes equipped with a traction control system similar to the 2014 V-Strom that monitors wheel speeds, throttle position, rpm, and gear position but with three levels (plus off) instead of two and designed specifically for the GSX-S's more sporting intent. The

TC system can be adjusted on the fly via a rocker switch on the left handlebar switch gear.

The twin-spar aluminum frame is all new, with modern design and manufacturing technology allowing it to actually come in lighter than the GSX-R frame, and the swingarm is the same spec and size as the GSX-R item. The fully adjustable 43mm KYB inverted fork (which features a slightly higher internal oil level on the half-faired F model for more anti-bottoming properties) holds radial-mount, four-piston Brembo calipers clamping on 310mm discs, with a single 220mm disc and Nissin single-piston caliper out back. The GSX-S1000F and standard GSX-S1000 are equipped with Bosch ABS, with a non-ABS GSX-S1000 available for those who prefer without.

### Original Versus Remake

Although we were disappointed in the build quality of the GSX-S750 ("Budget Blasters," Oct./Nov. 2015), it was the complete opposite with its new literbike brother. The GSX-S1000F bristles with nice bits all around, starting with the

Renthal tapered aluminum "Fatbar" handlebar that features a nice bend and puts your torso in a slightly more upright and comfy position than the Ninja's solid bar risers. There's also more legroom with the Suzuki, and the seat is flatter and more supportive along with slightly better padding.

We initially lamented the nonadjustability of the GSX-S's windscreen compared to the Kawasaki's three-step adjustable unit, but that was before we spent some time in the Suzuki's saddle. Turns out that the GSX-S's aero work was spot on, with less buffeting than the Ninja at highway speeds; even vibration seemed to be less of an issue with the Suzuki. In the Kawasaki's favor, however, are slightly better fuel mileage (38 mpg average for the GSX-S, 40 mpg for the Ninja) and a larger fuel tank (4.5 versus 5.0 gallons for the Ninja).

The Kawasaki's 1,043cc DOHC inline-four is no rehash of an older supersport engine; it was built specifically for the Ninja 1000 and its Z1000 naked brother (and has since made its way to the Versys 1000). The engine was designed with



The Renthal Fatbar tapered aluminum handlebar has a nice comfortable bend. New LCD dashboard is a little cluttered and hard to read; wind protection from fixed windscreen is surprisingly good.



Unlike the GSX-S750, Suzuki didn't skimp on the GSX-S1000's brakes, with Brembo monoblock/radial-mount calipers and 310mm discs providing good stopping power.





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# CHANGING ROLES



## TEST NOTES KAWASAKI NINJA 1000 ABS

|   |                                     |
|---|-------------------------------------|
| + | Torquey, midrange-strong engine     |
| + | Fairly comfy ergos                  |
| - | Could lose some weight              |
| - | Sluggish handling                   |
| x | Used to be one of favorites, now... |

## SUGGESTED SUSPENSION SETTING

|               |                                                                                                                                               |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Front:</b> | Spring preload-7 turns out from full stiff; rebound damping-0.75 turn out from full stiff; compression damping-1.25 turns out from full stiff |
| <b>Rear:</b>  | Spring preload-28 clicks out from full stiff on hydraulic adjuster; rebound damping-2 turns out from full stiff                               |

strong midrange power in mind, and the Ninja certainly delivers in that respect. Plenty of serious steam is available literally off idle, with strong acceleration in the lower half of the rpm scale, allowing the Kawasaki to get off the line or make highway passes in top gear with little fuss.

While the GSX-S powerplant certainly isn't the beastly GSX-R1000 K5 mill we remember, it still gets with the program quite nicely in the GSX-S's intended scope. Although the Suzuki doesn't have the low-end or midrange torque of the Ninja, the dyno numbers don't tell the whole story that the top-gear roll-on numbers do. Because the Suzuki's engine revs quicker than the Kawasaki's midrange-designed unit—in addition to the GSX-S carrying about 35 pounds less weight—the Suzuki comes off the corners right with the Ninja. And once the tach needle hits 8,000 rpm, the GSX-S begins to disappear off into the distance as the GSX-R-based engine continues making good power right up to the 11,500-rpm limiter, while the Kawasaki's power curve and acceleration begin to flatten out. The only gripe with the Suzuki's mill is a slightly abrupt throttle response that requires some care when getting back on the throttle in a corner.

And speaking of corners, the Suzuki surprised once the pavement began to curve as well, with its fully adjustable 43mm KYB inverted fork and spring-preload- and rebound-damping-adjustable shock providing surprisingly good wheel and chassis control. The Kawasaki's older KYB suspension isn't nearly as capable, with bigger bumps causing the fork and shock to blow through

the first half of the stroke and then suddenly stiffen up in the second half, resulting in some kickback through the chassis that would upset handling in midcorner.

The GSX-S felt decidedly lighter on its feet than the Ninja in the corners, with easier turn-in and quicker response. While some of this could be attributed to the Suzuki's wider handlebar, we feel a good portion of the agility is due to the OEM tire choice; the GSX-S's OEM-spec Dunlop D214 Sportmax rubber provides quicker turning with more neutrality than the OEM-spec Bridgestone Battlax S20 tires on the Ninja 1000, which displayed comparatively sluggish turn-in and some resistance to steering input at full lean. Overall grip from both tires was good, though while the Kawasaki occasionally would touch down some pegs and hard parts during aggressive riding, the Suzuki's pegs never met tarmac.

The Kawasaki KTRC and Suzuki TCS traction control systems performed well on dry pavement, with both three-level systems (plus off) providing

very transparent intervention. Both system's intervention levels were about the same, with the least intrusive level allowing a small amount of wheel slip but nothing that would allow the rear end to move anything more than an inch or two sideways.

Suzuki definitely didn't skimp on the GSX-S's brakes, with the radial-mount monoblock Brembo calipers and 310mm discs providing good stopping power with decent feel and modulation, even with the ABS. The Ninja's brakes required more lever effort, and feel was lacking compared to the Suzuki's binders. Both ABS setups were fairly transparent, with no mushiness or weird feel when the systems were active.

## Welcome Back, Suzuki

If there was one manufacturer that was hit hardest by the global financial meltdown, it was Suzuki. After years of hunkering down and weathering out the storm, it appears the company is finally beginning to show signs of returning to the performance status it held back before the



While we have to admit that the Kawasaki's dash is beginning to look a little dated, it's still well designed, with the LCD panel easy to read with pertinent info.



The Ninja 1000's 1,043cc inline-four mill puts out excellent torque and midrange, but it's a bit outclassed by the Suzuki GSX-R-based engine.



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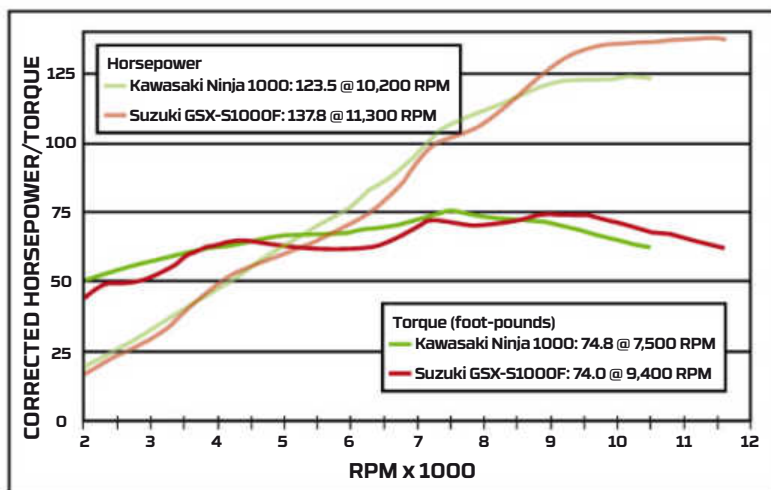


depression.

While the new GSX-S1000F ABS's low sticker price (\$10,999, while the naked GSX-S1000 ABS sells for \$10,499, and the non-ABS GSX-S1000 runs just \$9,999) initially had us worrying that price-point design was going to stifle its performance, we were definitely impressed (and relieved) once we got to ride the latest

Suzuki. Despite meeting that price level, the GSX-S1000F clearly outperforms the Kawasaki Ninja 1000, a bike that was already one of our favorites for sport-touring duty.

Looks like the Hamamatsu engineers are once again getting the freedom to show their handiwork, and it's great to see. Now, about that new GSX-R... **SR**



Although it appears the Kawasaki has a distinct advantage below 8,000 rpm, it's different out on the road, where the Suzuki's quicker-revving engine and lighter weight even things out.

## SPORT RIDER OPINIONS



**Kent Kunitsugu**

Age: 54  
Height: 5'8"

The GSX-S1000F ABS might not look all that flashy, but it's clear that Suzuki engineers were doing their homework this time. This bike is nothing like the disappointing GSX-S750; the engine has good power, the chassis and suspension work well, it has decent brakes, it's comfortable. And for less than \$11K? This one is worth a look if you're in the market.

I can't help but wonder if Kawasaki is shooting itself in the foot with the Versys and Ninja 1000 in the same showroom. One bike comes standard with bags, has better wind protection, plus some extras, for just \$800 more. Meanwhile, the accessory bags for the Ninja will set you back a lot more than \$800. I like the Ninja 1000, and with some accessories it's a great sport-touring mount; I'm just wondering how long it's going to survive in these changing times.



**Bradley Adams**

Age: 26  
Height: 6'3"

The first thing that comes to mind when I look at Suzuki's GSX-S1000F is, "What took you so long, Suzuki?" For years now, I and seemingly every Suzuki fan growing tired of sport-bike ergos have been screaming for a GSX-R1000 with an upright handlebar. I think half of those guys got tired of waiting and just went ahead and built their own. The rest probably went and bought something like a Ninja 1000...

But now the GSX-S1000F is here, and I've got to admit, I think it's worth the wait. No, it's not technically a GSX-R1000 sans clip-ons, nor does it scream performance, but I think it's exactly what the guy shopping in the sport-standard category wants (solid performance and comfort at a bargain price). On top of that it's, in my opinion, better than the Ninja 1000, with more power, less weight, and better handling.

Welcome to the party, Suzuki.

## RATINGS

| Bike                   | Kawasaki Ninja 1000 ABS | Suzuki GSX-S1000F ABS |
|------------------------|-------------------------|-----------------------|
| Fun to ride            | 8                       | 8.5                   |
| Quality                | 9                       | 9                     |
| Instruments & controls | 8.5                     | 8.5                   |
| Ergonomics             | 8.5                     | 9                     |
| Chassis & handling     | 8                       | 9                     |
| Suspension             | 8                       | 9                     |
| Brakes                 | 8                       | 8.5                   |
| Transmission           | 9                       | 9                     |
| Engine power           | 8                       | 9                     |
| Engine power delivery  | 9                       | 9                     |
| Ratings total          | 84                      | 88.5                  |

| Bike               | 2015 Kawasaki Ninja 1000 ABS                                                                            | 2016 Suzuki GSX-S1000F ABS                                                                              |
|--------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| MSRP               | \$11,999                                                                                                | \$10,999                                                                                                |
| <b>ENGINE</b>      |                                                                                                         |                                                                                                         |
| Type               | Liquid-cooled, DOHC inline-four, 4 valves/cyl.                                                          | Liquid-cooled, DOHC inline-four, 4 valves/cyl.                                                          |
| Displacement       | 1043cc                                                                                                  | 999cc                                                                                                   |
| Bore x stroke      | 77.0 x 56.0mm                                                                                           | 73.4 x 59.0mm                                                                                           |
| Compression ratio  | 11.8:1                                                                                                  | 12.2:1                                                                                                  |
| Induction          | Keihin DFI, 38mm throttle bodies, single injector/cyl.                                                  | Suzuki SDTV, 44mm throttle bodies, single injector/cyl.                                                 |
| <b>CHASSIS</b>     |                                                                                                         |                                                                                                         |
| Front suspension   | KYB 41mm inverted fork, adjustments for spring preload, compression and rebound damping, 4.7-in. travel | KYB 43mm inverted fork, adjustments for spring preload, compression and rebound damping, 4.7-in. travel |
| Rear suspension    | Showa shock, adjustments for spring preload, rebound damping, 5.4-in. travel                            | KYB shock, adjustments for spring preload, rebound damping, 5.1-in. travel                              |
| Front tire         | 120/70ZR-17 Bridgestone S20F N                                                                          | 120/70ZR-17 Dunlop Sportmax D214F M                                                                     |
| Rear tire          | 190/50ZR-17 Bridgestone S20R N                                                                          | 190/50ZR-17 Dunlop Sportmax D214 M                                                                      |
| Rake/trail         | 24.5°/102mm (4.0 in.)                                                                                   | 25.0°/100mm (3.9 in.)                                                                                   |
| Wheelbase          | 56.9 in. (1445mm)                                                                                       | 57.5 in. (1460mm)                                                                                       |
| Seat height        | 32.3 in. (820mm)                                                                                        | 31.9 in. (810mm)                                                                                        |
| Fuel capacity      | 5.0 gal. (19L)                                                                                          | 4.5 gal. (17L)                                                                                          |
| Weight             | 510 lb. (231kg) wet; 480 lb. (218kg) dry                                                                | 475 lb. (215kg) wet; 448 lb. (203kg) dry                                                                |
| Fuel consumption   | 35-44 mpg, 40 mpg avg.                                                                                  | 36-46 mpg, 38 mpg avg.                                                                                  |
| <b>PERFORMANCE</b> |                                                                                                         |                                                                                                         |
| Quarter-mile       | 11.00 sec. @ 127.58 mph                                                                                 | 10.64 sec. @ 132.68 mph                                                                                 |
| Roll-ons           | 60-80 mph/2.71 sec.; 80-100 mph/2.94 sec.                                                               | 60-80 mph/2.64 sec.; 80-100 mph/2.94 sec.                                                               |



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# THE GREAT ESCAPE(S)

**TWO BIKES. TWO DAYS. ONE ROUTE.  
WHICH DOES IT BETTER?**

BY BRADLEY ADAMS PHOTOGRAPHY BY KEVIN WING

Pick a spot on a map. Any spot. It can be hundreds or even thousands of miles away and accessible by anything from long stretches of highway to gravel roads, city streets, or freshly laid pavement winding through scenery worthy of an Ansel Adams photograph. Got your spot picked out? Okay, now—quickly—make a list of the bikes that can get you there, comfortably, quickly, and with the electronic wizardry to keep things from getting too interesting along the way. We're not the gambling type, but we'd bet money that your list is pretty short. We'd also bet that somewhere toward the top of your list you've written down Ducati Multistrada.

And for good reason. After all, Ducati's Multistrada has almost since its inception been the best option for riders who like their sportbike performance wrapped up in an adventure-bike guise that enables them to tackle hundreds of unrestrained miles with relative ease. Combine literbike-like horsepower with a competent chassis and an expansive electronics package that includes the recently added semi-active Skyhook suspension, and it's clear why the Multistrada has continually been such a huge success for Ducati.

Of course, it bears mentioning that much of the Multi's success came before BMW pulled the wraps off its new S 1000 XR, a lighter, more sport-oriented adventure-sport bike than the R 1200 GS that the Multistrada had gone up against in years past. So perhaps the question is, even with a newer, more sport-oriented adventure bike to go up against, is Ducati's Multistrada still one of the best bikes for getting you from your driveway to that far-away spot on your map?

To find out, this past month we picked up a map of our own and dropped a pin on a spot where we wanted to go then drew up a route that included everything from long stints on the highway to canyon roads and city streets cutting through sleepy towns. By the time we completed the near-400-mile route on each bike (one complete loop on the Multi and then another on the S 1000 XR), we were pretty sure we had the answer.









# THE GREAT ESCAPE(S)



The S 1000 XR makes good use of its lighter weight and more sport-oriented tires to steer into corners with ease. Chassis feel and handling is as you'd expect from a bike coming from a manufacturer who also makes one of the best literbikes on the market.

## TEST NOTES BMW S 1000 XR

|   |                                                |
|---|------------------------------------------------|
| + | Great power, smooth delivery                   |
| + | Quick, composed handling                       |
| - | Lack of fine-tuning adjustment for electronics |
| - | Vibration in handlebar                         |
| x | Trackday or tour? How about both?              |

### First, a quick look at the competitors:

BMW's S 1000 XR is an all-new machine but utilizes an engine not all that different than the one in BMW's S 1000 R roadster, which really is not all that different than the one in its S 1000 RR. The XR's (and R's) cylinder head ports are modified a bit when compared to the RR's, and valve lift is different, though big numbers like bore and stroke are the same. With the XR's more adventurous intentions in mind, however, BMW has developed an all-new aluminum frame and increased structural rigidity of the subframe to accommodate extra cargo. Additionally, when compared to the R, the XR has more rake, more trail (now a whopping 117mm), plus a 65mm-longer swingarm, which contributes to the bike's 109mm-longer wheelbase. Suspension travel is 5.9 inches front and 5.5 inches rear, versus 6.7 inches front and 6.7 inches rear on the Ducati.

Standard features of the XR include ABS, two riding modes (Rain and Road), and ASC (Automatic Stability Control, BMW's basic traction control system). The optional Pro riding mode makes two additional riding modes available, Dynamic and Dynamic Pro. Both have more aggressive throttle response and include Dynamic Traction Control and ABS Pro, which is BMW's version of cornering ABS. The XR also comes with BMW's HP Gear Shift Assist Pro for clutchless shifts in up or down direction, as well as BMW's semi-active Dynamic ESA (Electronic Suspension Adjustment) as an option.

Bear in mind Ducati is not putting some

long-in-the-tooth Multi up against BMW's new XR, rather a heavily updated version that now features everything from Desmodromic Variable Timing (DVT) engine to a Panigale-culled Inertial Measurement Unit (IMU) that measures roll, pitch, and yaw; a Bosch-Brembo ABS 9.1ME Cornering braking system; cruise control; Ducati Wheelie Control (DWC); Ducati Traction Control (DTC); a 20mm-longer rider seat that's height adjustable; LCD dashboard; and windshield with new adjustment mechanism that enables 60mm of vertical adjustment.

Still with us? Cool, because on the S model tested here Ducati has made even more updates, not the least of which includes larger, 330mm front brake rotors that clamp onto superbike-culled M50 four-piston calipers (the BMW's rotors are 320mm); a Ducati Multimedia System (DMS) that enables Bluetooth connection between the bike and a smartphone; Sachs Electronic suspension with semi-active Ducati Skyhook Suspension (DSS); full LED headlights with Ducati Cornering Lights (DCL); forged wheels; and a full-color, 5-inch TFT dashboard. Also on the S model, the new IMU works with the Ducati Skyhook Suspension to enhance its operation, which basically means more performance in any situation you land yourself in.

The semi-active suspension on both the BMW and Ducati continually makes adjustments to compression and rebound damping while riding, though on the Ducati it is possible to adjust

base settings for both the fork and shock so that the starting point is closer to how you prefer it. Optional settings for either end include Hardest, Harder, Default, Softer, and Softest, and it's possible to customize each riding mode ahead of time with the settings you'll like to use for different sections of your ride. As an example, we customized Sport mode (one of the four riding modes) with Hardest base settings for the canyon riding we knew we'd be doing and Touring with Softer base settings for our time on the highway. Along the same lines, we adjusted the eight-level traction control and power delivery as you'd see fit for the extremely diverse riding situations we'd encounter on our route. Creating these custom modes took mere minutes, with the Multistrada's new handlebar switches proving extremely intuitive and



Two things you wouldn't expect from a bike wearing BMW badges: a height-adjustable windscreen that is more difficult to adjust than the one on the Ducati, plus a handlebar that vibrates profusely at around 5,000 rpm. Otherwise, the bike is sporty but with comfortable ergonomics.





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# THE GREAT ESCAPE(S)



## TEST NOTES DUCATI MULTISTRADA 1200 S

|   |                                       |
|---|---------------------------------------|
| + | Comfortable ergos                     |
| + | Easy-to-adjust screen                 |
| + | Lots of electronic adjustment         |
| - | Inexplicable flat spot in power curve |
| - | Clunky transmission                   |
| x | A new ECU away from winning?          |

The Multistrada S is a what's what of electronic wizardry rolled up in a touring-heavy package that somehow works just as well in the canyons and not too bad off road. LED headlights are seriously impressive at night too.

the S model's sizable dash making running through menu options rather straightforward. Sure, all of these adjustment options seems extreme, but the benefit of the Multi's system is that once you've spent the 10 minutes to customize each mode, you almost never have to go back and make changes; you've basically got a personalized mode for every type of situation you'll encounter.

Unfortunately, on the S 10000 XR individual settings for electronic systems cannot be adjusted as freely. For example, power delivery, base suspension settings, and traction control settings for each mode are all preset by BMW engineers, who apparently think they know exactly what engine dynamic and suspension action you're going to want based on the mode you're in, with the only option being to shut off traction control or ABS and switch between Dynamic or Road modes for the suspension, Road offering a more plush feel. So German of them...

It's worth mentioning even still that we liked the overall action of the S 1000 XR's semi-active suspension and felt like the difference between Road and Dynamic was enough so that Road worked well for highway riding and Dynamic for canyon carving. Similar to what we've experienced in our comparison tests between the S 1000 RR and Panigale, there is less of noticeable change in feel as the BMW's semi-active electronic suspension makes its minute changes to the damping. Combine this more consistent feel from the suspension with a taut German chassis and you

have a bike that feels more confidence-inspiring down a twisting section of road and enables you to carry sportbike-like lean angles almost with ease. The BMW also steers into the corner a bit lighter than the Ducati, which also requires just a little more effort to keep cranked over through a corner despite featuring more aggressive rake and trail numbers plus a shorter wheelbase.

Keep in mind, of course, that Ducati's Multistrada comes standard with enduro-inspired Pirelli Scorpion Trail tires, which have bigger tread blocks for continued performance as you switch over to Enduro mode (another of the bike's four riding modes) and head off into the dirt. And while these tires do offer more confidence off road than the BMW's Bridgestone T30 tires, we did notice that after 100-plus miles on twisting paved roads, they began to heat up and squirm, which was cause for lighter inputs at the bar and still more movement at the contact patch. If you don't plan on hitting the dirt, like ever, then it might not be a bad idea to switch over to more sport-oriented tires, as that might re-establish some confidence on your canyon rides.

Unfortunately, there are still some other things that you are going to have to fix on the Multistrada. Or should we say that Ducati is going to have to fix, as one of the biggest issues with our testbike is a significant flat spot in the bike's power curves, which is most noticeable between around 3,500 and 6,000 rpm. Ducati has stated that they are continually evaluating the problem

in hopes of completely smoothing out its power curve. It's very likely that current Multistrada owners will receive a notice soon from the factory telling them to bring their bike in for the update. That's good too, as the resultant flat spot can cause big problems when you're cruising at around 4,000 rpm, crack the throttle open, and are expecting to accelerate. For us, this happened on the freeway when we were going to pass a car and sometimes as we went to open the throttle while rolling through a long, sweeping corner. In many instances, we'd have to downshift once or twice to get the bike out of the rpm range where the flat spot is most prevalent. In a lot of ways, to us, it feels simply like the bike's brain is stuttering as it takes information from wheel-speed sensors, a gyro, suspension-travel sensors, this sensor and



One issue that our larger-footed test riders had was with the backs of their boots hitting the exhaust cover on the right side of the Multi and the centerstand on the left side of the bike.



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# THE GREAT ESCAPE(S)

| SPECS             |                                                                                                     |                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Bike              | '16 BMW S 1000 XR                                                                                   | '15 Ducati Multistrada 1200 S                                                                       |
| MSRP              | \$19,790 as tested                                                                                  | \$21,094 as tested                                                                                  |
| ENGINE            |                                                                                                     |                                                                                                     |
| Type              | Liquid-cooled, transverse DOHC inline-4, 4 valves/cyl.                                              | Liquid-cooled, DOHC V-twin, 4 valves/cyl.                                                           |
| Displacement      | 999cc                                                                                               | 1198cc                                                                                              |
| Bore x stroke     | 80.0 x 49.7mm                                                                                       | 106.0 x 67.9mm                                                                                      |
| Compression ratio | 12.0:1                                                                                              | 12.5:1                                                                                              |
| Induction         | BMS-X EFI, single valve 48mm throttle bodies, dual injectors/cyl.                                   | Bosch EFI, elliptical throttle bodies w/ 56mm equivalent dia., dual injectors/cyl.                  |
| CHASSIS           |                                                                                                     |                                                                                                     |
| Front suspension  | Sachs 48mm semi-active fork w/ electronic compression and rebound damping; 5.9-in. travel           | Sachs 48mm semi-active fork adjustable for spring preload and five damping settings; 6.7-in. travel |
| Rear suspension   | Sachs semi-active shock adjustable for spring preload, compression, rebound damping; 5.5-in. travel | Sachs semi-active shock adjustable for spring preload and five damping settings; 6.7-in. travel     |
| Front tire        | 120/70ZR-17 Bridgestone T30F EVO                                                                    | 120/70ZR-17 Pirelli Scorpion Trail II                                                               |
| Rear tire         | 190/55ZR-17 Bridgestone T30R                                                                        | 190/55ZR-17 Pirelli Scorpion Trail II                                                               |
| Rake/trail        | 25.5°/4.6 in. (117mm)                                                                               | 24.0°/4.3 in. (109mm)                                                                               |
| Wheelbase         | 61.0 in. (1548mm)                                                                                   | 60.2 in. (1529mm)                                                                                   |
| Seat height       | 33.1 in. (840mm)                                                                                    | 32.5-33.3 in. (825-845mm)                                                                           |
| Fuel capacity     | 5.2 gal. (20L)                                                                                      | 5.3 gal. (20.1L)                                                                                    |
| Weight            | 535 lb. (243kg) wet; 504 lb. (229kg) dry                                                            | 548 lb. (249kg) wet; 516 lb. (234kg) dry                                                            |
| Fuel consumption  | 35.7-45.8 mpg, 40.0 mpg avg.                                                                        | 35.9-43.3 mpg, 41.3 mpg avg.                                                                        |
| PERFORMANCE       |                                                                                                     |                                                                                                     |
| Quarter-mile      | 10.75 sec. @ 132.03 mph                                                                             | 11.15 sec. @ 126.23 mph                                                                             |
| Roll-ons          | 60-80 mph 2.54 sec./80-100 mph 2.83 sec.                                                            | 60-80 mph 3.17 sec./80-100 mph 4.45 sec.                                                            |

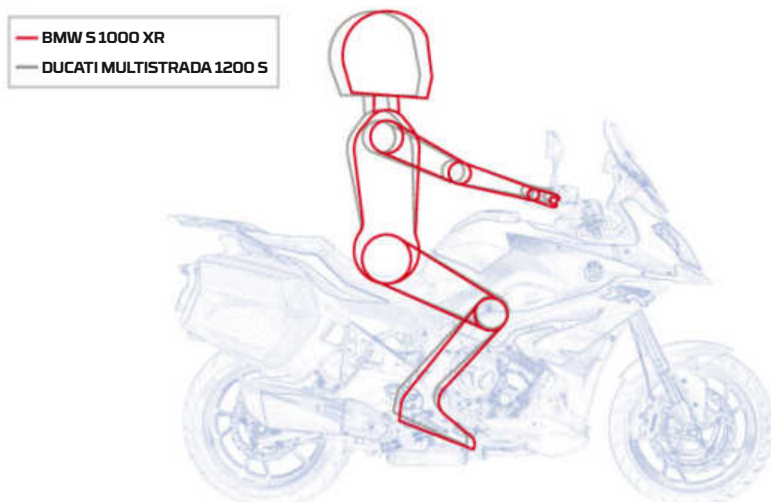
that, and then tries to give you the “best” performance possible. It’ll be interesting to see what Ducati can do to resolve the issue either way.

The flat spot is a shame too because in all other ways Ducati’s DVT engine delivers on its promise, offering smooth fueling in the low rpm range and strong power up top. With the DVT model, we also noticed a slight bump in fuel economy, the newest Multistrada offering up good range over the course of our ride.

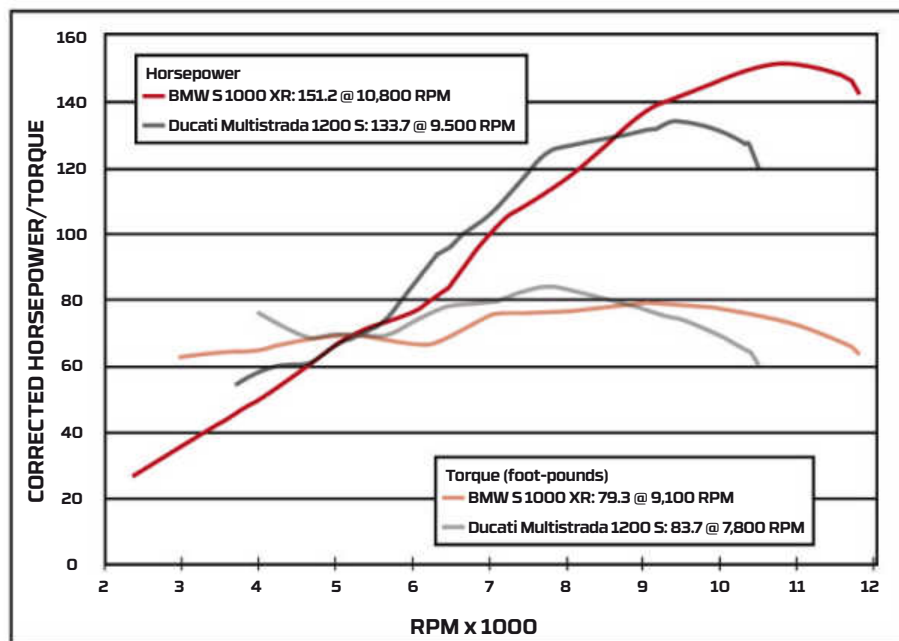
Still, the S 1000 XR doesn’t really fall behind in either of these categories. In fact, in regards

to the engine, we’d say it’s significantly better. Sure, the inline-four isn’t as character-rich as the Ducati’s admittedly stirring V-twin, but fueling is crisp (if not just a bit soft at initial throttle openings to limit any adverse inputs to the chassis), and the bike builds power so smoothly it’s like you can’t do anything wrong. BMW’s optional HP Gear Shift Assist Pro only adds to the experience, allowing you to work your way up and down through the transmission sans clutch. This, combined with the BMW’s light handling and taut chassis, are a reminder you’re on a superbike turned

## ERGOS



Overall, the Ducati offers more comfort in long-haul riding, with better seat and more natural reach to an upright handlebar. BMW bar is flat and pulled back a bit, while the seat is nonadjustable.



While Ducati’s new DVT engine does smooth the V-twin out at ultra-low rpm, the ECU (or other) in current trim is not allowing it to make power in a smooth manner through the midrange. Fortunately, Ducati is hard at work to resolve the problem. Still, the BMW (dyno’d here in optional Dynamic Pro mode) makes massive power in a very smooth manner.



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# THE GREAT ESCAPE(S)

adventure-sport bike. On the other hand, Ducati's somewhat clunky transmission (which gifted us a few false neutrals throughout our ride, by the way) combines with its slightly less agile handling to remind you that you're on more of a touring bike with sporting intent.

And that's fine, if long-haul comfort and accoutrements like Bluetooth connection is higher on your list of priorities. In this sense, the Ducati does well and goes on to take the cake by offering up a more heavily padded seat, windscreen that is easier to adjust with just one hand, plus a taller one-piece handlebar that doesn't vibrate quite as frantically as the one on the BMW, which pulsates rather obnoxiously with the engine running at around 5,000 rpm. And, oh, by the way, that's about where the tach needle sits when you're rolling 70 mph down the interstate in sixth gear. The vibration through the BMW's handlebar does dissipate above or below that mark, though by 6,500 rpm (where it really starts to go away) you're ready to get a ticket.

Aside from the vibration though, the only real thing we can fault the BMW for is its lack of electronic adjustability. And still it offers a fair amount, just not as much as the Ducati. Otherwise, it felt more confidence inspiring, complete, and, most importantly, fun.

Convenient, because assuming that spot you've marked on your map is anything more than 400 miles away, you're going to want something that can keep you entertained along the way. Safe to say, that alone puts the S 1000 XR at the top of our list of bikes that could take us to that spot on our map. **SR**

## RATINGS

| Bike                   | BMW S 1000 XR | Ducati Multistrada 1200 S |
|------------------------|---------------|---------------------------|
| Fun to ride            | 9             | 7                         |
| Quality                | 10            | 7                         |
| Instruments & controls | 8             | 9                         |
| Ergonomics             | 8             | 9                         |
| Chassis & handling     | 9             | 8                         |
| Suspension             | 8             | 8                         |
| Brakes                 | 9             | 9                         |
| Transmission           | 9             | 7                         |
| Engine power           | 9             | 8                         |
| Engine power delivery  | 9             | 7                         |
| Ratings total          | 88            | 79                        |



Don't let the S 1000 XR's beak fool you; this bike really isn't meant for going off road. Instead, it makes mincemeat of canyon roads and is nimble enough for cutting around town with ease.



It's hard to deny that the Multistrada's styling is striking; at least it is for us. Seat is adjustable between 32.5 and 33.3 inches, a nice feature for a bike of this size.

## SPORT RIDER OPINIONS



**Kent Kunitsugu**

Age: 54

Height: 5'8"

I really liked the last-generation Multistrada, so I was looking forward to the latest DVT-powered version. Unfortunately, it appears the transition to US specs was troublesome for Ducati because the new Multi has a terrible midrange flat spot. It's too bad because I like the adjustability of the Ducati's suspension compared to the BMW XR, and its ergos fit me better.

The BMW's engine is a beast, and the chassis and suspension work well. I didn't go off roading like Bradley, but in all the environments I rode the bike performed admirably. Only some vibration at highway cruising speeds and perhaps a taller sixth gear make the gripes list. If you're looking for adventure that doesn't get too serious once the pavement ends, the XR fits the bill.



**Bradley Adams**

Age: 26

Height: 6'3"

Naturally, I didn't exactly stick to the route I'd planned for this test; if there was a road that looked challenging, I went for it—paved or not. The result was a real appreciation for the Multistrada S's versatility. From torn-up sections of pavement to graded dirt roads, there wasn't much the bike couldn't handle. Sure, I was oft-reminded of the bike's fueling issues, but I've got faith in Ducati to resolve that and the other problems that the new Multi is catching flak for. I'm confident these issues will be worked out in due time, and in the end you'll have a great option when shopping for an adventure-sport bike.

Of course, the BMW doesn't have fueling glitches or electronic quirks. It just works really well—almost as if it's based off one of the best sportbikes on the market. Oh, wait, it is...





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# MAINSTREAM ELECTRIC

Victory Motorcycles takes a bold step forward to release its new 2016 Empulse TT electric bike

BY TOM MONTANO PHOTOGRAPHY COURTESY OF VICTORY MOTORCYCLES, BARRY HATHAWAY

» Electric vehicles are becoming quite common these days, but it's the automobile that pretty much dominates the consumer electric-transportation market. You see Teslas everywhere now, and all the major auto manufacturers have an electric or hybrid model in their lineups. But how often do you see an electric motorcycle on the road?

The problem is that electric motorcycles are a hard sell, and building an electric bike can be very costly, especially since the range is still very limited compared to a gasoline engine. Although a few eBike manufacturers have been at it for a while, no major existing motorcycle company I know of (i.e., the Big Four Japanese companies or their European counterparts) have produced a road-going eBike, and that gives cause to wonder: Is it worth it?

Still, Victory Motorcycles seems to think it is, and the company feels the time is right to get into the game. Victory's parent company, Polaris Industries, recently purchased the motorcycle division of Brammo, Inc., and the Ashland, Oregon-based company is one of the few that has produced a road-going eBike with relative success.

But perhaps the real reason behind the introduction of the new 2016 Victory Empulse TT is the rebranding of the Victory line of motorcycles. Victory makes great cruisers, but it appears as if the company is looking toward attracting a broader demographic of riders. Ventures such as the Project 156 Pikes Peak runner, or the Victory Pro Stock dragbike team, or the 2015 Isle of Man TT Zero race (where Lee Johnston finished third on one of the team eBikes) are all-new territory for what was not so long ago a cruiser-only bike company. By entering into the eBike market, Victory is hoping to gain more exposure, which is part of its new "Building the Future of American Muscle" plan. You could even reason that inviting *Sport Rider* to a Victory launch is a real testament to the commitment in the new direction the company is taking.

The 2016 Victory Empulse TT is not that dissimilar to the last Brammo

Empulse from which it was derived. Naturally, Victory took what was there and revamped it by adding its own flair to produce the new model. The Empulse TT features a new Brammo Power lithium-ion battery pack with a capacity of 10.4 kilowatt-hours (kWh). The new battery pack is rated at 103.6 volts, with a maximum of 117.6 volts; what that means is that the new battery has a 10-percent increase in capacity over the previous model.

The liquid-cooled, internal permanent magnet AC induction motor produces 54 hp and 61 foot-pounds of torque and is fitted to a six-speed transmission complete with a multi-plate hydraulic wet clutch. A dual power mode option is now standard issue, with Sport mode offering full battery output for maximum power. Another key feature is the 3.6kW on-board charger, which not only allows you to plug in at any current 240-volt charging station but is also the fastest in class. In just 3.5 hours you will be fully charged, with 80 percent in two hours.

Victory brought the assembled gang of journalists to ride its new Empulse TT at High Plains Raceway, about an hour east of Denver, Colorado. The track has a good mix of fast and slow corners, plenty of elevation changes, and a long enough straight to see what the Empulse TT could really do.

Most of us were skeptical about the need for a transmission on an electric bike. You don't need the clutch to pull away or when you stop, and none of the previous electric bikes I have ridden had transmissions. For my first couple of laps, I left it in third gear as per the Victory technicians' advice. Once I did find my way around the track, I started to use the transmission, which I found to be rather rough. You have to concentrate to get through the gears, but the more you ride it, the easier it becomes. By downshifting into the corners, you can optimize acceleration coming out—similar to a conventional motorcycle.

Interestingly enough, the transmission really does help with acceleration and even more so with top speed. I was topping out at around 95 mph





in third or fourth gear, but when I started using all six gears, I managed to get the Empulse up over 110 mph.

The bike has some good acceleration, and the throttle feel is like any normal motorcycle at speed. But when it comes to getting back on the throttle exiting the corners, it does hesitate a bit. The twist felt somewhat unrefined but still manageable. Interestingly, even the gear-position indicator takes a moment to catch up when you're on it hard. The regenerative braking system, which is activated by letting off the throttle, mimics the feel of a normal motorcycle while decelerating into a corner and worked well.

Chassis-wise, the Victory's 43mm adjustable inverted fork and non-linkage-equipped rear shock felt like they were overworked a bit. There is no real suspension movement once you get going, and the bike feels packed down as if the spring rates weren't optimized for the bike's weight (the Empulse TT weighs in at a claimed 470 pounds). As far as turn-in and chassis composure on the exits, the Empulse did fine, but there was a noticeable lack of front-end feel entering the corners. It felt as though the front was already loaded from the weight, and once you activated the Brembo four-piston/radial-mount calipers and 310mm discs, any remaining trail has left the house,

giving you a vagueness normally associated with lack of trail. The bike has good stopping power, but it takes some effort due to the lower-spec Brembo master cylinder fitted to the Empulse TT.

Of course the more you ride the Empulse, the more you begin to figure out how to get the most out of it. Despite its 470-pound weight, the Victory boys did a very good job of hiding that heft. The bike feels small, and you will not notice the weight. As far as rolling stock, the Empulse TT comes fitted with a 3.5 x 17-inch front and a 4.5 x 17-inch rear wheel widths. The Continental SportAttack II tires held up well, not moving around too much while providing good grip and feedback.

By the end of the day, everyone was flogging the Empulse TTs pretty hard, and the bike was giving in to excessive heat generated by the electric motor and batteries. When ridden hard on the track, the newly designed instrument cluster featuring a tachometer plus an LCD panel showing speed, gear selection, battery status, estimated range, and system status will let you know the bike's had enough by suddenly displaying a "Battery Hot" warning. In order to produce that much power, a lot of energy is transformed, which in turn produces a lot of heat. This warning came up on me several times on the track, but I'm sure on the street it will be a different story, and you'll



While the regenerative braking system helps with slowing the Empulse TT, the majority of braking is handled by the Brembo four-piston/radial-mount calipers and 310mm discs. Braking power was good but high-effort.



Strangely enough, the Empulse TT's dash includes an analog tachometer along with an LCD information panel showing speed, gear selection, battery status, estimated range, and system status.

## 2016 Victory Empulse TT

MSRP \$19,999

### ENGINE

TYPE Liquid-cooled, internal permanent magnet AC induction motor

BATTERY Lithium-ion

BATTERY CAPACITY 10.5kWh

BATTERY VOLTAGE 103.6V, maximum voltage 117.6V

### CHASSIS

FRONT TIRE 120/70ZR-17 Continental SportAttack II

REAR TIRE 180/55ZR-17 Continental SportAttack II

RAKE/TRAIL 24°/3.8 in. (97mm)

WHEELBASE 56.0 in. (1473mm)

SEAT HEIGHT 31.5 in. (800mm)

CLAIMED CURB WEIGHT 470 lb. (213kg)

likely be able to get much more range out of the Empulse.

In fact, the real limiting factor of the whole equation is still the batteries themselves. More batteries can provide longer range and more power, but that comes at a price. They're not cheap, and besides the fact that they're by far the most expensive part of an electric vehicle, they also take up lots of room and are quite heavy. Perhaps new battery technology might turn up in the future, and then Victory's move into the electric-motorcycle market will make perfect sense. If you have all the infrastructure in place, then you'll be able to capitalize quicker and more easily when the new technology appears.

I started out the day questioning if this was a good move by Victory, but in the end the new 2016 Empulse TT came good. The track was admittedly a bit hard on the Empulse, challenging the bike in ways you would never do on the street. I can see where this bike could be very beneficial on the street, whether it's commuting to work or the occasional blast up the canyon. With more and more charging stations coming online and the hope of improved battery technologies in the near future, the Empulse TT will be more inviting for the general public.

Polaris is a big company with plenty of resources that will no doubt be key to the success of Victory's entry into the electric motorcycle market. The Empulse TT goes for \$19,999 and comes with a five-year warranty. So is it worth it? I guess that depends on how green you feel your performance needs to be. But that's the big question with any electric vehicle, right? **SR**



# THE PERFECT SETUP

A guide to making adjustments and improving your bike's handling, one step at a time

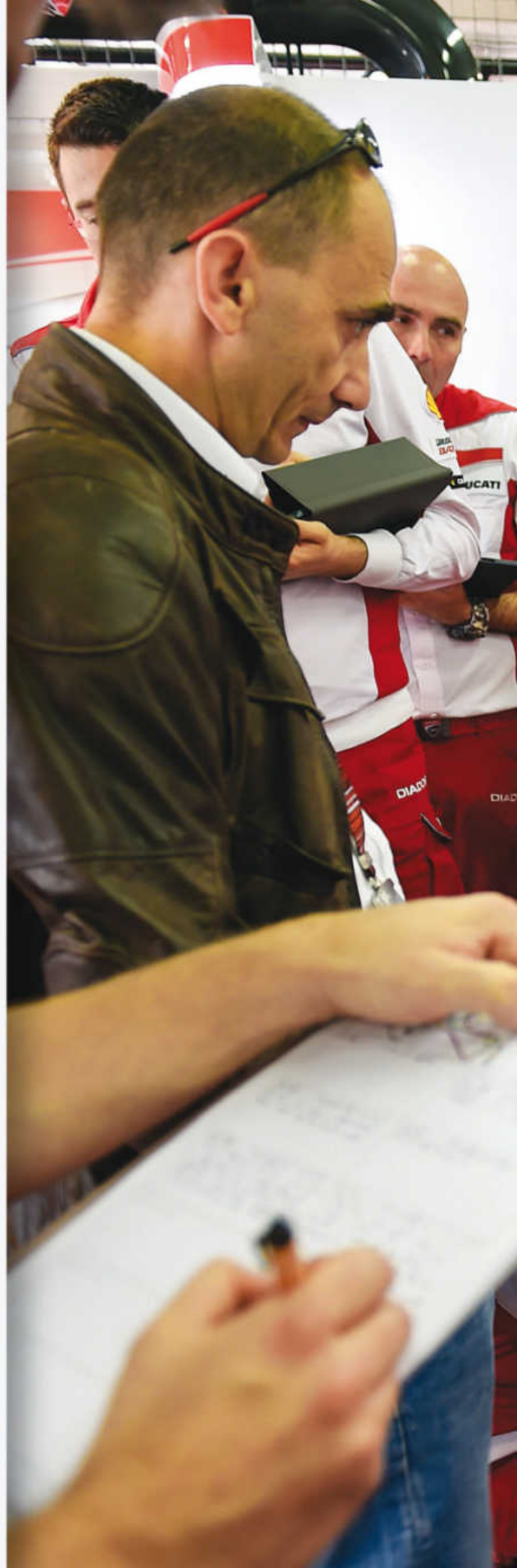
BY ANDREW TREVITT

**M**In the last issue of *Sport Rider*, we talked about chassis geometry and how you can make adjustments to change important characteristics of your motorcycle, such as rake, trail, anti-squat, and center of gravity position ("All About Geometry," Oct./Nov. '15). In this issue, we will explain how you can put that information to use and make changes to your suspension setup for a better-handling and safer ride both on the street and at the track.

We, and many other publications, have published articles about setup and what all the various adjusters on your bike do and where they are located. We will not rehash that here but instead point you to the Suspension Guide on the SR website ([sportrider.com/tech/sportbike-suspension-guide](http://sportrider.com/tech/sportbike-suspension-guide)), where you will find all the basic information about springs, preload, damping, sag, and so on. Additionally, your owner's manual is a good resource for the basics, as they pertain to your bike specifically. In this article we will not concentrate on the nuts-and-bolts side of setup but rather the overall approach—what's important and how all those geometry numbers interact—and present a method for obtaining the perfect setup.

But is there such a thing as the perfect setup? Yes and no. The goal for any chassis setup is that it allows you to concentrate 100 percent on your riding so that you can ride at your best without being held back by the motorcycle. On the street, that means you can ride comfortably all day at the pace you want, paying better attention to the traffic around you for more safety. Trackday riders want to also ride all day, be able to concentrate on their riding skills, and not worry about tearing up a set of tires. Racers need to be able to focus entirely on racecraft and winning the race, rather than being distracted by a handling issue or having to work around a problem. Attain that goal—whatever your element—and you have the perfect setup.

But that setup is only perfect for that rider, at that track or road, in those conditions. Your perfect setup for Mazda Raceway Laguna Seca most likely won't work very well at Daytona; a setup that is perfect on Angeles Crest Highway in California might not be all that good at Deals Gap. And your perfect setup is not going to be perfect for your buddy who outweighs you by 50 pounds and has a different riding style. Even for you, as your riding skills improve, the setup will have to evolve accordingly. So, while it's possible to have "the perfect setup," don't count on it being perfect for long.







MotoGP riders have a huge team of people to help with setup, as they have to deal with an almost infinite number of adjustments. Notice how almost everyone in this picture is taking notes: You might have to be your own suspension specialist, data technician, crew chief, and tire engineer all rolled into one, which means taking all the notes for those jobs as well.



# THE PERFECT SETUP

## Where to Start—Five Easy Rules

Before you begin messing with those clickers or spinning wrenches, it's important to establish a procedure for how you will go about the process of experimenting with adjustments and making changes. We've distilled this down into a handful of simple rules; follow these and everything will be a lot easier for you down the road.

**1. Have a baseline to work from.** This can be something from your owner's manual, our own suggested settings we include with our road tests (also available on our website in the suspension guide), or settings from a previous outing. It doesn't have to be a great setup, but you must choose it deliberately and be able to go back to it at any time. Whatever you do, don't just jump on your bike and count on making changes from some mystery setup because that's exactly what you'll end up with—another mystery setup.

**2. Measure your sag.** Suspension sag—how much travel is used with you sitting on your bike at a stop—is a very useful reference number, as it tells us where in the range of travel we can expect to be operating. Too much sag and you are in danger of using all the travel and bottoming the suspension; too little and you might top out the fork or shock at inopportune times. Look for between 25mm and 30mm of sag at the rear, closer to 30mm on the street, and closer to 25mm on the track. Up front, a lot depends on what's inside your forks as far as springs and top-out springs; don't worry so much about the specific setting unless a reputable suspension person gave you a number to aim for, but definitely record what your sag is for reference.



You might have to con some buddies into helping you measure your sag, but the numbers tell a lot about where in the travel your suspension is working, and you must know the sag values to make progress. If you ever go to a suspension specialist looking for help, we guarantee the first question you will be asked is, "What's your sag?"



Tire wear can tell you a lot about how well your suspension is or isn't working. Look for an even pattern across the cornering surface, with no obvious tearing or narrow bands of extreme wear. If it doesn't look right, check with your tire vendor before making suspension adjustments; it might be a pressure, temperature, or compound issue that will need to be sorted first.



Zip-ties on your fork and shock can show you how much travel you are using and if they are in danger of bottoming. This Honda CBR1000RR SP fork has been modified, and the two orange lines represent soft bottom and hard (metal-to-metal) bottom internally.

**3. Make one change at a time.** This might seem obvious, but we even catch ourselves breaking this rule and ending up with exactly the consequences you expect: If you make two changes and your bike works better or worse, how do you know what change is responsible? Keeping to a single adjustment with each iteration lets you pinpoint exactly what the change did and whether it was beneficial or not.

**4. Take lots of notes.** Every time you ride your bike or make an adjustment, write down the change you made, why you made it, and how it affected your bike's handling. Not only will this help you undo any changes you make if you get lost, but also you will be able to—for

example—return to a setting you know works at a particular track or fix a problem that could creep up again two years from now.

**5. Don't forget about tires.** Your bike's handling depends on tire choice and condition almost as much as on any setting adjustment you make. What we are concerned with here is consistency: You want to be sure the changes in your bike's handling that you experience are from the adjustments you make and not from a change in tire compound, pressure, temperature, or even wear. Use tires with the appropriate street/track bias to match where you are riding, and minimize variables by regularly checking pressures, using warmers at the track, and keeping an eye on wear.



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# THE PERFECT SETUP

## Geometry Recap

Last issue we broke geometry down into three parts: Trail and front-end geometry; anti-squat and rear-end geometry; and center-of-gravity position. To recap, this table outlines the adjustments you can make to affect each property.

## Dynamic Geometry

Also in the last issue, we briefly touched on dynamic geometry and how rake, trail, anti-squat, and center-of-gravity height change as the bike goes around the track and the chassis moves on the suspension. The takeaway here is that we can make adjustments to change chassis geometry under certain conditions rather than making a static change that affects geometry in all conditions. For example, to increase front ride height you can lower the forks in the triple clamps; this changes the static geometry. Another option though is to increase front preload, a dynamic change which has the same effect in that it raises the front of the motorcycle with any given load. Provided the suspension is not topping out (which is more likely once you do increase front preload), the fork-height change and the preload change will feel almost exactly alike when you ride the bike.

Another example: We can raise the rear of the bike to increase swingarm angle for more anti-squat (a static change), but that also affects rake and trail. If we didn't want to change that front-end geometry on corner entry, when the rear suspension is close to topped out, we could fit a stiffer rear spring to keep the rear end higher only when it's deeper in the stroke midcorner. Anti-squat would be increased, with a smaller effect on rake and trail. Most street and trackday riders will be fine with OEM adjustments and won't have to resort to swapping springs, but know that it's an option if you can't find a compromise that works for your riding.

## Let's Ride

With your baseline setup duly recorded, how to proceed? Most setup changes are made to correct existing handling problems: ride, address an issue with an adjustment, and repeat. The riding part is just as important as the adjustment part, and the better you can identify and isolate a troublesome issue, the better you will be able to decide how to correct it. For street riders, don't simply go out and ride and hope for the best: Have a planned, repeatable route that includes the type of roads and riding you want to match your bike to and has fairly consistent conditions, and pick a time that has as little traffic as possible.

|                                        |                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Increase trail</b>                  | Lower rear ride height, raise front ride height, increase rake, or decrease triple clamp offset     |
| <b>Decrease trail</b>                  | Raise rear ride height, lower front ride height, decrease rake, or increase triple clamp offset     |
| <b>Increase anti-squat</b>             | Raise rear ride height to increase swingarm angle, fit shorter gearing, or raise the swingarm pivot |
| <b>Decrease anti-squat</b>             | Lower rear ride height to decrease swingarm angle, fit taller gearing, or lower the swingarm pivot  |
| <b>Raise center of gravity</b>         | Raise front and rear ride height an equal amount                                                    |
| <b>Lower center of gravity</b>         | Lower front and rear ride height an equal amount                                                    |
| <b>Move center of gravity forward</b>  | Move axle rearward in the swingarm; move rider forward                                              |
| <b>Move center of gravity rearward</b> | Move axle forward in the swingarm; move rider rearward                                              |



COURTESY OF KAWASAKI

One of the most difficult aspects of setting up your bike might be this part. At first, don't expect to (or try to) ride anywhere close to your usual pace while at the same time focusing on setup and handling issues. At the track, your pace should be comfortable and consistent; you are not out to set a lap record, but still keep an eye on lap times to see how your setup is progressing.

Ride your route in its entirety the first couple of times you work on setup so that you don't end up making changes based on just one type of road.

Street or track, ride at a comfortable pace that lets you focus on how your bike is behaving and what characteristics could be improved. That comfortable pace means you won't be going your quickest, as you will have to split your concentration. On top of that, be sure to leave enough leeway in your attention span so that you don't sacrifice safety, especially on the street. The conundrum here is that your pace needs to be close to your usual so that your setup suits that speed and not your slower, comfortable pace. Don't be surprised if you are quite a bit slower the first few times you ride; as you get more experience with the process and the important handling characteristics, the setup side will fade into the background and you will be able to ride closer to

your regular speed. Most top-level riders can ride at race pace and still provide significant feedback about the motorcycle after a session, but that ability comes from years of experience.

As you ride your bike then, what are you looking for? You want to pick one or two issues that are either making you uncomfortable or are preventing you from going faster. It might be something that you know could be improved because of experience—for instance, you know your bike should turn quicker because you rode your buddy's identical bike and his arcs into corners better, or maybe your bike steered quicker when you had different tires on it. Or it may be a comfort issue—your bike loses traction over bumps on corner exits, and you don't have the confidence to open the throttle as early as you'd like. After your ride, you should be able to pick one characteristic that you'd like to improve.



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# THE PERFECT SETUP

## Time to Spin Wrenches

We've prepared a handy chart at the end of this story that outlines some common maladies with recommended adjustments to resolve them. Most items in the table list more than one potential fix, and here you must use your best judgment to pick which adjustment to make. If you are just starting out, stick to the easy adjustments like damping or ride height (via preload) if they are an option; an important part of the process is getting a feel for what adjustments do what, so it's all good experience. Make the adjustment (remember, just one adjustment at a time) and go for another ride. If your bike works better and the change improved what you expected it to improve, then good work. Maybe try another adjustment in the same direction and see if things improve even more. If handling is not better, however, then go back to what you know and try something else.

How drastic should your changes be? You want to make adjustments such that you will notice a definite difference when you ride your bike again, either good or bad. In terms of ride height, a 4mm change equates to about 1mm of trail on most bikes, and experienced riders will notice a handling effect with that adjustment; newer riders, or those experimenting for the first time, will want to make steps of 6mm or even 8mm so that those differences are easily felt and categorized. Note that the same applies to preload and sag: A 4mm change in sag will affect trail by about 1mm through most of the suspension's travel.

Up front, remember that lowering the fork tubes in the triple clamps by 1mm will raise ride height by 1mm. Fork preload adjusters typically have a 1mm pitch, making one turn of adjustment equal to 1mm of sag (and effective ride height). Out back, collar-type preload adjusters and shock ride height adjusters are usually also 1mm pitch, but the linkage must be taken into account; a ratio of 2:1 is a good ballpark for most linkages, making a two-turn shock length or preload change equal to 4mm in ride height. On big bikes especially, be wary when making rear ride height adjustments. Even a 4mm change can have a big impact on anti-squat.

A good rule of thumb for damping adjustments is to make changes in increments of one-third the current setting for riders new to setup. For example, if front compression is set to 10 clicks out from full stiff, a change of three clicks should be noticeable. If your rebound adjuster is at two turns out, try steps of between a half and three-quarters of a turn. Experienced riders will want to work in smaller increments, down to single clicks or quarter-turns even.



A 2mm change in shock length or spring preload equates to a 4mm change in ride height or sag on most bikes, in turn affecting trail by about 1mm. If your shock has a remote preload adjuster, it's worth determining how many clicks or turns equal 1mm of actual preload adjustment. This shock has been marked "4cl=1mm" (four clicks equals 1mm).



KEVIN WING

After each riding session, take a moment to collect your thoughts and write down some notes on your bike's handling. Consider each aspect as we've outlined them in the chart: straight, braking, corner entry, midcorner, corner exit, and over the full course of a lap or your street route. Match the issues you want to address with what adjustments would be required, and decide on one adjustment to make for the next session.

Keep in mind that quite often when you make an adjustment to fix one problem, that exact same adjustment may introduce a new problem that needs addressing. For instance, if you do raise the rear ride height to increase anti-squat as in the earlier example, you have also decreased rake and trail and will have to deal with those consequences—good or bad. With experience comes the knowledge of what change to make to fix a certain problem but with the least impact on the setup as a whole. This is why it's important to measure and keep track of sag: If you know your sag is at the far end of

an acceptable range, you can use that to your advantage when making a change. If you wanted more anti-squat and you know your rear sag is on the high side, as an example, it would make sense to add preload. That would add anti-squat dynamically and at the same time put sag closer to optimal. Always look at your setup as a whole in this manner, rather than just focusing on each issue as it comes up; chasing problem after problem without looking at the big picture will let you fix all those individual problems, but at the end of the day you might not have made any headway on your overall setup.



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Joe Roberts  
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# THE PERFECT SETUP

## Setup Maintenance

As mentioned, once you find a setup that works, don't count on it working forever. You will have to make constant changes to account for different roads or tracks, conditions, tires, changes to your bike, and even as your riding improves. And if you do find that perfect setup, how do you know it couldn't be even better? Many riders and race teams are constantly experimenting with settings, even once they've found a decent race setup; some go as far as always making a change for every session, regardless of how well the bike is working. Just like your riding, your chassis setup should be constantly evolving, and you should always be on the lookout for ways to make improvements. **SR**

| STRAIGHT                                                            |                                                                                                                                                                                      |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Harsh ride over bumps; chassis is unstable and flighty              | Reduce compression damping to improve compliance                                                                                                                                     |
| Ride gets increasingly harsh over a series of bumps                 | Reduce rebound damping to avoid packing                                                                                                                                              |
| High-frequency wobble or headshake                                  | Increase trail to add stability                                                                                                                                                      |
| Low-frequency weave                                                 | Check tires, wheel bearings, and steering head bearings for wear and adjustment; check wheel balance; add rear low-speed compression or rebound damping to minimize oscillation      |
| BRAKING                                                             |                                                                                                                                                                                      |
| Rear tire lifts or skates over pavement                             | Reduce rear rebound damping to keep rear tire on the ground; lower center of gravity or move center of gravity rearward (but not by changing rear wheel position); increase rear sag |
| Fork bottoms                                                        | Add front preload, low-speed compression damping or increase fork oil level to improve bottoming resistance; increase front spring rate                                              |
| Lack of braking feel                                                | Reduce front preload or low-speed compression damping to increase load transfer to front tire; decrease fork oil level; decrease front spring rate                                   |
| Excessive chassis pitch                                             | Lower center of gravity to reduce load transfer; add front low-speed compression damping or rear rebound damping                                                                     |
| Front tire locks in reduced traction conditions                     | Raise center of gravity to increase load transfer                                                                                                                                    |
| CORNER ENTRY                                                        |                                                                                                                                                                                      |
| Lack of feel when brakes are released                               | Increase front rebound damping to prevent fork extending too quickly and unloading front tire                                                                                        |
| Front tire tucks or turns in too abruptly, especially in slow turns | Increase trail to reduce steering quickness and add stability                                                                                                                        |
| Heavy, slow steering                                                | Decrease trail for quicker steering; raise center of gravity                                                                                                                         |
| Bike resists turning while brakes are applied                       | Increase both rake and trail by raising front ride height or lowering rear ride height                                                                                               |
| Heavy steering in side-to-side transitions                          | Raise center of gravity                                                                                                                                                              |
| Bike is unstable in side-to-side transitions                        | Lower center of gravity; add rebound damping and/or reduce low-speed compression damping to keep chassis settled                                                                     |



Once you've made an adjustment, always record the change immediately; you'll forget if you leave it to the end of the day—guaranteed. Your notes should be elaborate enough to serve two purposes: One, you can go back to any point in time and set your bike up exactly the same. Two, if the same handling issue crops up in the future, you can refer to your notes and see exactly what steps you took to fix the problem the first time. It's a good idea to go over all the adjusters every few sessions and make sure your notes match and nothing gets changed accidentally.

| MIDCORNER                                                                     |                                                                                                                                                                                   |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ground clearance issues                                                       | Raise center of gravity                                                                                                                                                           |
| Lack of compliance or traction feedback                                       | Reduce compression and/or rebound damping; decrease front and/or rear spring rate                                                                                                 |
| Bike is unstable and loose over rough pavement, or wallows over rolling bumps | Increase compression and/or rebound damping                                                                                                                                       |
| Steering input is required to keep a constant line                            | If you have to countersteer into the corner (push the bike down) to keep a steady line, reduce trail; if you have to countersteer out of the corner (lift the bike up), add trail |
| CORNER EXIT                                                                   |                                                                                                                                                                                   |
| Bike runs wide and resists holding a line                                     | Increase anti-squat to keep load on the front tire; increase rear compression damping or increase rear spring rate to reduce squat; increase front sag                            |
| Excessive wheelspin                                                           | Reduce anti-squat for more load on the rear tire; reduce rear compression damping or reduce rear spring rate for more squat; move center of gravity rearward                      |
| Lack of traction feedback or compliance                                       | Reduce rear low-speed compression and/or rebound damping; reduce rear spring rate                                                                                                 |
| Rear suspension pogs during acceleration                                      | Increase rear compression and/or rebound damping                                                                                                                                  |
| Wheelies                                                                      | Lower center of gravity; move center of gravity forward                                                                                                                           |
| Shock bottoms                                                                 | Increase anti-squat; increase spring rate; increase preload                                                                                                                       |



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# ROAD TO REDEMPTION





# A LOOK BACK AT THE FIRST YEAR OF THE NEW MOTOAMERICA CHAMPIONSHIP

BY BRADLEY ADAMS PHOTOGRAPHY BY BRIAN J. NELSON

Twelve months ago American roadracing was on the verge of extinction. There were only five races on the AMA Pro Racing schedule, no TV coverage, the SuperBike grid lacked riders, and the general feeling in the pits was that of despair. Today, at New Jersey Motorsports Park during the final round of

the inaugural MotoAmerica season, the newly formed MotoAmerica organization is dotting the "i" on a longer, nine-race schedule, TV crews are walking about the paddock filming content for the series' show, there are 25-plus Superbike/Superstock 1000 bikes on the grid, and, more importantly, there is a general feeling of content within the paddock.





That does not mean American road racing has a complete bill of health. In fact, nearly everyone in the paddock will admit that the recovery process has only just begun and that the road ahead will be filled with hurdles and hardships, if not only engulfed in negative comments spewing from any number of social media sites: "We expected more from you." "You guys suck." "One-week TV delay, are you kidding? What do you want me to do, sleep for a week?" That's just a few of the comments you'll find from disgruntled race fans within minutes of scrolling through some of MotoAmerica's social media accounts. Most people are upset by the series' lack of live TV but perhaps unaware of the position MotoAmerica staff was put in roughly 12 months ago when it took control of the professional race series.

"We get it, and we understand where they're coming from," says MotoAmerica President Wayne Rainey at New Jersey Motorsports Park during the final race of the season. "You know, the thing is that when all of this got started last September, we had no staff and no rules. We had no race tracks, and we had no marketing team. We had nothing, and our first race was in six months. We had to jump right away, so we said, 'Okay, guys, what's the goal here?'"

"At the end of the day we knew that the most important thing was to calm the system and stabilize our sport," Rainey continues. "In order to do that we had to make an investment and hire the right marketing people, the right communications people, and the right operations people, and that was a multi-million-dollar thing. As soon as we had

people in place, we were able to change the rules. We went in and added classes then updated the schedule and went from five races to nine. We realized though that we weren't going to get it all done in the first year. So we put a cap on our budget and said, 'Let's just do the best we can with this.' A lot of the fans are mad because there's no live race coverage, but when you look at the live TV thing, to do it properly was more than we were willing to spend on the whole program this year.

"For the first year, we were okay with a week delay," Rainey adds, in reference to the MotoAmerica show that airs on CBS Sports Network days after the race. "Well, we weren't okay with it, but where we were as a company in the first few months and where the series was when we started, we didn't even know if we could make a live show work. If you've got a live broadcast and are paying all that money, it's absolutely got to work. You cannot have any delays. Last year DMG had the live stream option. Now we have that plus a TV package, so I'm still happy with that."

MotoAmerica partner Chuck Aksland adds to the conversation: "It was very important for us to create a base, and that base was the show. We wanted to create confidence that we could actually run races, have a good program, call races well, and keep them running. That's the foundation of the whole MotoAmerica series—running a race properly and efficiently. If we were going to check any one box this year, that was the one we wanted to check. If we had live TV and couldn't run a race, well, that just would have been the wrong way to do it."

While they probably didn't realize it at the



MotoAmerica President Wayne Rainey (right) and MotoAmerica partner Chuck Aksland (left) have both spent a good part of their lives in the race paddock but will admit that running a race series is an entirely different challenge. Both say that they are having fun but are continually striving to make it better. "I think it'll be good when we get the manufacturers back and get live TV," Rainey says.

## KEEP AN EYE ON THESE GUYS!



### My MotoAmerica Season—2015 Superbike Champion Cameron Beaubier

"This year was totally amazing. The bike has come a long ways, and it's only going to get better. For me, I've been working really hard with my fitness and my riding and taking every session as serious as possible from the first lap. Josh [Hayes] is a world-class rider, and so is Roger [Hayden], and to be able to beat those guys is pretty special to me. It hasn't been easy, that's for sure though. I had a couple crashes there midseason and couple little other issues. Overall I just can't thank my team enough."



### My MotoAmerica Season—2015 MotoAmerica Supersport Champion JD Beach

"Coming in to 2015 I kind of didn't really expect anything. I knew that we had a great bike, and I had really pushed myself over the off-season. Then I brought a new crew chief on this year, and we just kind of jelled really well together. I was hoping to get some wins, but to come away with eight wins total and the Supersport title is awesome. It's definitely more than I could have expected."



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# ROAD TO REDEMPTION

time, the MotoAmerica staff's foresight and budget-influenced decision regarding live TV would be a blessing, as weather would ultimately play havoc on the series and challenge the newly formed group quite literally from beginning to end. "We had so much rain in the first three races that our spec-tire supplier, Dunlop, had burned through its entire allotment of rain tires and was having to ask teams to bring their own rain tires to get through practice and stuff," Rainey remembers. "Just nobody anticipated us going through this many rain tires in this short amount of time. I think it's rained at just about every race [all except one, actually]. Luckily, one of the first decisions we made as a group for the series was to make sure we were able to race in the rain. With the schedule [DMG] had been racing on, that wasn't always possible, at least in a safe manner. So we pushed that all the tracks we went to this year were safe. I think making sure it was safe, though, paid off because we've been able to race. Racers have to be able to go out there and not worry about being safe, which is important to us. We had to forfeit some great circuits. We'd love to be at Mid-Ohio as an example. There's a lot of fans there, and riders love that place. And MotoAmerica would love to be there. We just couldn't see us racing there in the wet."

"Still, where the rain really hurt us this year was attendance," he continues. "A lot of racing fans make their mind up about going to an event the day of the race. They'll wake up on Sunday morning, and if the sun is out, they're here. But if it's raining, they're not. A classic example this year is Road Atlanta, where there was four straight days of rain. To sit out in the rain for four straight days is not realistic. So I think the rain really hurt attendance this year, and I'd expect to see more people at events like [Road Atlanta] next year."

The other goal is, of course, to get more manufacturers involved, as right now the main participants are just Yamaha and Suzuki (with Triumph and Aprilia each supporting a team of their own and KTM making obvious contributions for the

The entire 2015 MotoAmerica season was mired by bad weather, with rain all four days at Road Atlanta, the second event on the calendar. "To sit out in the rain for four straight days is not realistic. So I think the rain really hurt attendance this year, and I'd expect to see more people at events like that next year," Rainey says.



That's the foundation of the whole MotoAmerica series—running a race properly and efficiently. If we were going to check any one box this year, that was the one we wanted to check.

RC 390 Cup class). The move to more teams will not happen overnight, though Rainey and crew have a plan for at least making the series more appealing for the manufacturers that vacated the paddock years back.

"Having Suzuki and Yamaha stay involved in the series and keep it at the level that it was, there's a big debt owed to these two manufacturers, but they also need competition," Rainey suggests. "They want other factories to come back in just as badly as we do, so we're working on that. Immediately, one of the things we wanted to do was change the tech rules because we thought that would create more interest with the OEMs that had gone away. In the past, each manufacturer had to develop a bike [specifically] for the AMA Superbike championship, and now the way our championship is aligned with the FIM in regards to the rules, it's easier for them to build a bike. As an example, the factory Suzuki team can now work with the team out of Japan, or BSB, or even World Superbike on developments because they're building a bike based off similar rules, which drives the costs of bike development down. And that helps because the budgets don't have to be what they once were when you raced in AMA Superbike. And that's part of the strategy for getting Honda and Kawasaki and Ducati back in the paddock; with the rules the way they are, the

manufacturer doesn't have to spend the money developing a special bike just for our class.

"Also, I think people just took a wait-and-see approach with us this year," Rainey says. "I mean, they knew who we were, but we hadn't done this before. We hadn't run a racing series, and I think there were a lot of skeptics. Now, what I feel is everyone recognizes we aren't making any drastic changes to try to turn the sport upside down. We just basically want to make it more in line with



MotoAmerica has adapted its rules so that they are more in line with the rules for other championships, a move that it says should bring down the cost of bike development (manufacturers can work with teams in other championships on developments), thus attracting more manufacturers to the series. For 2015, Aprilia came on board to support the HSBK Racing team. Rainey hopes that Honda and Kawasaki aren't far behind.



## My MotoAmerica Season—2015 Superstock 1000 Champion Jake Gagne

"This was my first year on a big bike, but right away I felt super-comfortable on the R1, so my expectations almost right away were to win. We wanted to win as many races as we could and try to not worry about the championship—if it came, it came. And it seems like that's what happened. Riding a big bike was a big learning curve even still, just with lines and how you've got to ride the bike—just how physical it is to ride. I made a few personal mistakes, and we had some mechanical stuff throughout the season, but at the end of the day we got enough wins to make it happen. It's cool to be close to the Superbikes at some places too. Obviously we hoped that would be the case, but you never know. Different tracks suited us better, like New Jersey and Barber. But I think I kind of surprised myself how close we could get sometimes. I think the R1 is just so good even in the trim we have it. It's not a huge deficit. Maybe there's a little bit power-wise and electronic-wise. But I just got to ride it as hard as I can, and you know we're usually pretty close."





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# ROAD TO REDEMPTION



other racing series around the world and work to stabilize things. I think a lot of people see that was the right way to go, and I think the approach will bring more interest to the series.

"Even now, Honda is back in on a commercial side, as a partner," Rainey continues. "They don't have a team yet—I think because they don't have a new bike like they would like to have—but they've told their fans and their customers to come support MotoAmerica. They've got a toe in the water here. Kawasaki is the same way—they have no presence in the USA, on the racing side of it, and they were never going to have that in the



On any given race weekend, Wayne Rainey can be seen rolling through the pits talking to racers, racers' parents, or fans. The sense is that he's working with them to better the sport, rather than just managing a series.



One of the big surprises of the 2015 season was the competitiveness of the Superstock 1000 bikes, with Jake Gagne (shown here) and other Superstock 1000 racers often running toward the front of the Superbike class, though scored separately. Rainey says that hopefully in the future there are enough bikes in each class to run the races independent of each other.

past with the way the rules were, but now we're in discussions, and they like the way our rules are written. It's starting to make more sense for them as a company, so I think they're thinking about it. In fact, I know they're thinking about it."

More manufacturer involvement means more seats for up-and-coming racers and thus a greater chance of American riders having the chance to develop as racers and eventually move on to a World Championship series, an idea which very clearly motivates Rainey.

"Racing is not broke, and the riders are as competitive now as they have ever been," Rainey says. "They just don't have the opportunity they once did. Over here the OEMs had gone away, so there were less seats available, less money being spent in the paddock, and less room for progression. There's nothing wrong with the riders though, honestly. All of the top guys here could go race in any national championship and I believe could race for wins."

For Rainey and Aksland, having a rider move through the MotoAmerica ranks and go on to win

a World Championship would be the mark of a job well done. "You know, a few years ago we had somebody at a very high level tell us that there wouldn't be another American World Champion—that the Americans had been passed up and left behind," Rainey says.

"That's throwing down a gauntlet for us," Aksland adds. "And really, I think it will be a while until we're satisfied with where everything is at. It probably won't end until there's another American World Champion. Then we'll sit back and say, 'Look at what we did.'"

That racer-like urge to win mixed with the entire MotoAmerica staff's commitment to the continued progression of the sport has already led to a series that teams and riders appear to take greater pride in being a part of. The series might still be a work in progress and have just one year under its belt, but the general sense is that the progress will continue. Don't doubt these guys or the MotoAmerica series. And don't doubt American roadracing—it's not going anywhere anytime soon. **SR**



## My MotoAmerica Season—2015 MotoAmerica Superstock 600 Champion Joe Roberts

"It's been pretty amazing the year we've had. You know, when I joined on with the Meen Motorsports team this year the plan was to win the Superstock 600 Championship, and my personal goal was to just win as many races as I could. And I won 10, so for me it was for sure a success. And to be able to come to New Jersey and race up a class in the Supersport class and win a race there and get the pole, it was for sure a surprise. I don't think the year could have worked out any better."



## My MotoAmerica Season—2015 MotoAmerica RC 390 Cup Champion Gage McAllister

"The year has been great, and racing new RC Cup class has been really awesome. I love spec series racing and had even raced in the XR1200 class in AMA for a year and a half. That got me into road racing and was really my only road race experience. But for this, I really appreciate the KTM guys bringing the RC Cup to MotoAmerica because, without the class, I probably wouldn't have had the chance to win a championship this early on, and I'd be having to only ride a 600. I think this class is the perfect stepping-stone for guys like me and has been a good addition for MotoAmerica."



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# BITCHIN' FRESH KIT

BY BRADLEY ADAMS PHOTOS BY JOE MCKIMMY

» When you look good, you feel good. And when your bike looks good, well, you know where we're going with this one... Below are eight products for either getting your bike clean, keeping your bike clean, or keeping your stuff organized for the track. Give 'em a look and see if you don't feel better already.

## SIDI FAENZA SOCK

Dirty. Sweaty. Smelly. Uncomfortable. None of these are words you want associated with your feet, which is why a set of specially designed socks is generally worth the investment. These Sidi Faenza socks are made in Italy and use a central band with increased elasticity around the top of the foot for super-close fit, plus varying levels of compression around the ankle, along the shin, and along the bridge of the foot. The socks cost \$25 per pair. [motonation.com](http://motonation.com), (619) 401-4100

## YOSHIMURA R&D CASE SAVERS

Crashing is a messy business, especially if you manage to put a hole in your crankcase covers and oil starts spewing out. While you can't always avoid crashing, you can avoid some of the aftermath with a set of case savers like these from Yoshimura R&D, which are CNC-machined from 6061-T6 aluminum, claimed to install in just minutes without removing factory engine case covers or fairings, and cost \$195 for a set. [yoshimura-rd.com](http://yoshimura-rd.com), (909) 628-4722

## SLICK PRODUCTS

A clean bike is a fast bike. Okay, maybe that's not entirely true, but there's no denying that it feels better to ride a clean bike over one wearing 500 miles' worth of bug remnants and road grime. To help with keeping your bike clean, Slick Products has designed its Multi-Purpose Cleaner & Degreaser (\$11.99) to penetrate and easily remove dirt, oil, grease, and grime on plastic, rubber, aluminum, chrome, metal surfaces, and more without causing corrosion. For even more reassurance, Slick Products has designed its Multi-Surface Shine & Protectant (also \$11.99) high-gloss clear coating to repel dirt and oil, prevent muck from sticking to the bike's surfaces, renew faded exteriors, and protect against surface corrosion. [slickproductsusa.com](http://slickproductsusa.com), (855) 754-2501







#### D.I.D 520 ERV3 CHAIN

Motorcycle chains stretch, deteriorate, and eventually accumulate more road grime than is possible to clean off. At that point, it's time for newer, cleaner links. And for these instances D.I.D offers up its performance-oriented 520 ERV3 X-ring race chain, which is claimed to provide critical weight savings over most standard chains and stands out by way of gold inner and outer links. Each of the chain's pins is put through a heat-treatment process that makes it harder and stronger, plus the chain is claimed to significantly reduce friction in the drive system and be extremely wear resistant. Price is \$248.22.

didchain.com, (615) 323-4020



#### AMERICAN KARGO DUFFEL BAG

Amerikan Cargo's Duffel Bag is designed to keep your clothes, laptop, and other necessities organized when heading to or from the racetrack, with a ballast pocket on the end to keep your clean and dirty clothes separate. On top of that there's tool storage, a four-point system that allows you to throw the bag over your shoulders, plus anchors for tying the bag to your bike—if that was your transport to the track in the first place—or bed of your truck in case the dirty clothes smell *that* bad. The best part: The \$115 duffel also has a number-plate system for easily customizing your bag with your race number using Velcro numbers (sold separately in kits for \$4).

americankargo.com, (310) 761-8151



#### K&N HIGH-FLOW AIR FILTER

K&N's high-flow air filters use multiple layers of woven cotton gauze media to limit flow restriction and keep the air going into your bike clean, subsequently providing engine protection and a claimed bump in horsepower and torque. The \$79.99 filter is washable, reusable, comes pre-oiled, and is custom engineered to fit each application, with specific base seal and sealing bead for the intended model.

knfilters.com, (800) 858-3333



#### AKRAPOVIC SLIP-ON EXHAUST

Nothing cleans up the back half of a sportbike quite like an aftermarket exhaust. Even with just a slip-on, it's out with the old, boring, heavy bits and in with cleaner, lighter, better-looking new ones. And that's the idea behind Akrapovic's new boldly shaped mufflers, which incorporate carbon-fiber and titanium parts into the design for lighter weight, in addition to an updated profile that improves the flow of the exhaust gases. This slip-on exhaust for a 2015 R1 retails for \$884.95.

revzilla.com



#### MOTO-D SPORTBIKE MAT

Consider the spot where you park your bike a workspace, and Moto-D's Sportbike Mat a way of keeping that workspace—plus your bike—tidy, clean, and professional. In addition to saving your knees every time you kneel down to work on the bike, the Moto-D mat keeps oil, brake fluid, or other liquids from dribbling down on your garage floor or pit space. The 3-foot-wide by 8-foot-long mat also has a nonslip rubberized backing for grip on any surface. Retail is \$119.99.

motodracing.com, (877) 246-0976



# PRE-RIDE CHECK

Making sure you and your bike are ready to go

BY ANDREW TREVITT PHOTO COURTESY OF YAMAHA

» Sometimes the simplest things can spoil a great ride or race. Maybe you get halfway through your day's ride with your buddies and can't remember closing the garage door when you left. Or you get to the grid for your race and realize you forgot to put your earplugs in. Or just as you're rolling out for your trackday session you realize you've still got 40 psi in your tires. Some simple checks before you start out, and making those checks routine, can help eliminate those miscues, making for both a safer and better ride that day.

Often when we think of a pre-ride checklist it's the bike that comes first: tire pressure, oil level, chain tension, and other day-to-day maintenance. What's important here from a riding standpoint is that you don't want to be midway through a ride, remember that you were supposed to check something, and have it bother you for the rest of the day and distract you from your riding. We've found it definitely helps to work these checks into a routine so that performing them is a matter of course. At the track, your routine may include something like: Check tire pressure every time the warmers come off and check oil level and chain tension every time the warmers go on. You can even work some longer-term items in there as well, such as checking brake pads every time the warmers go on first thing in the morning or checking steering head and wheel bearings for

play every time new tires go on.

For street riders these checks might require a bit more creativity. Some you might want to make before every ride, such as oil level or tire pressure. Others you can combine with another task, such as checking chain tension at every fuel stop. One item we find street riders particularly remiss on is lighting: Check your headlight, taillight, brake light, and turn signals before every ride, and work it into your routine. The object of having these set routines is that you are not thinking about your bike's maintenance when you are riding, leaving you with a clear head to focus on what's important.

Your pre-ride checklist should also include the gear you wear. For some riders the routine is more the way everything is stored between sessions: back protector on the table, gloves on top, helmet to the right, earplugs in the front vents, boots and leathers in the trailer. For others it's the order of getting suited up: right leg in the leathers first, left leg, back protector, chest protector, right arm, left arm, earplugs, right glove, left glove, helmet. A bit extreme perhaps, but the routine nature ensures everything is in place. Street riders must find a way of working into their routine sundries like spare earplugs, wallet, cell phone, a clear shield for the ride home, and so on. Is everything present and accounted for? Again, it's a matter of finding

whatever routine works for you so that you don't end up forgetting something that could potentially ruin your day.

Routines in place, every time you jump on your bike you can be confident that there will be no surprises halfway through your ride, but there is one last check: Are you ready to go? That is to say, is there anything nagging at you that may prevent you from focusing entirely on your ride? It may be that you had a crappy day at work and now have to ride home in the rain, or you had a cross word with your significant other before you left for the track. Whatever the case may be, it's important you do whatever is necessary to clear your head before riding. Spend a few more minutes at the office making notes for the next day before you leave, or make a phone call to smooth things over at home. Many racers clear their head before a final with a bit of alone time, perhaps with music, and you can work this into your own regimen as well at the track. Street riders can also benefit from this quiet time before a ride, with a final check to make sure everything is in order every time the key goes in the ignition.

Some riders have such a regimented routine of pre-ride checks and rituals that it borders on superstition, but there is nothing wrong with that. The few minutes before every ride is well worth it if it helps you ride better and safer. **SR**



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Photo: Brian Nelson

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# RACER HIGH SPEED GLOVES

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PRODUCT EVALUATIONS

It's not often we come across a glove that exceeds our expectations (especially above the \$200 range), but this is one of those rare occasions. When we were provided a set of Racer's High Speed gloves for test, we were given the usual ad-speak about fit, comfort, protection, etc. But after wearing the gloves almost daily for more than six months in all types of riding environments, we were very surprised to find that the promo-talk wasn't all just hot air.

Constructed primarily out of top-grain cowhide with kangaroo leather on the palm and inner finger areas, the Racer High Speed glove is intended as the company's professional-level roadrace product. As such, the palm also features dual-density Knox SPS palm sliders to help prevent scaphoid injury in a crash (hard impacts to that area can cause compression or hyperextension injuries to the scaphoid bone in the hand, a notoriously small and difficult bone to heal). There is TPU (thermoplastic polyurethane) plastic armor on the fingers, knuckles, and wrist, with the knuckle protector encased in Superfabric, a highly abrasion-resistant textile.

There are perforations in the long gauntlet, finger sides, and top of the hand for airflow, and the ring/pinky fingers on both sides are adjoined to prevent finger roll injuries during a crash. Keeping the gloves in place is a Velcro-fastened wrist strap and cuff flap, and the High Speed glove is fully CE-certified.

Right off the bat, we found the High Speed gloves to be very comfortable, with proper tailoring ensuring that break-in almost wasn't necessary; within the first couple of rides, the gloves felt like well-worn favorites. There is no bunching or tightness in the fingers or

anywhere on the glove, which is something we can't say about countless other handwear we've tested over the years. The kangaroo leather in the palm and inner finger areas has remained supple, even after constant usage on hot days that has surely exposed them to sweat (which causes some cheaper leathers to get hard and crusty), and control feel is excellent. Even though your hands feel well protected in the High Speed gloves, you don't feel like you're wearing a set of welding mitts, and you're able to easily sense what's going on at the brake and clutch levers.

About the only gripe we can come up with regarding the Racer High Speed glove is that it doesn't ventilate that well, but we'd gladly put up with that in exchange for the comfort and protection it otherwise provides. And while we (thankfully) haven't had the opportunity to test

the High Speed gloves' protection capabilities, we're pretty confident they'll handle the situation well. One reason is that after more than 11 months of almost daily wear on everything from 120-mile commutes to track testing to sport riding in canyons, not one seam or area on the gloves even shows any signs of coming apart—again, something we can't say about countless other gloves we've tested, and it's a definite sign of excellent quality construction.

Needless to say, we'd highly recommend the Racer High Speed glove to both track and street riders. They're a little pricey but well worth it in our opinion. **SR**

## DETAILS

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YOUR ABNORMAL GUIDE TO THINGS ABNORMAL

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Sport Rider magazine

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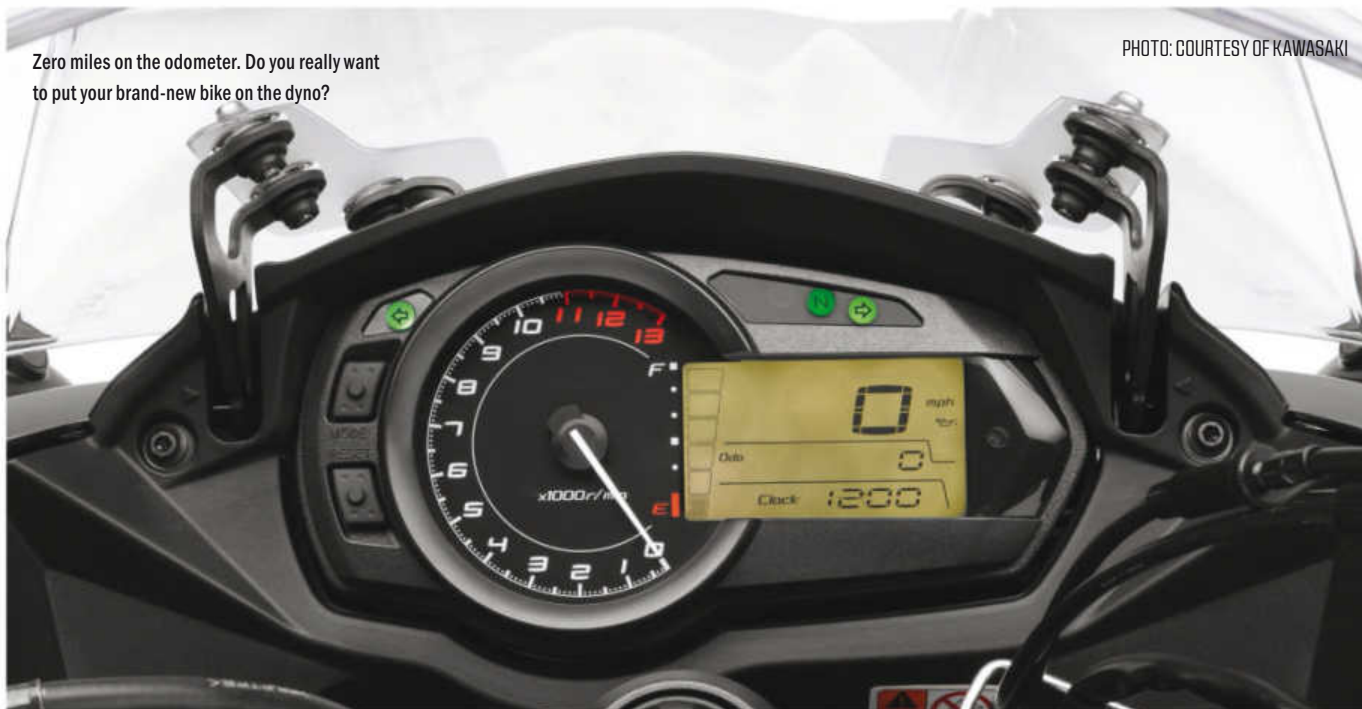
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Zero miles on the odometer. Do you really want to put your brand-new bike on the dyno?

PHOTO: COURTESY OF KAWASAKI



## Break-In Procedure

I just picked up a new Kawasaki ZX-6R and am wondering about break-in procedure. In the owner's manual it says to keep rpm under 4,000 for the first 500 miles then under 6,000 rpm to 1,000 miles. I have found all kinds of things on the web about break-in, everything from following the manual religiously to a dyno session with pulls to redline almost right away. Who's right?

**Bob Walker**

Columbus, OH

There are two important considerations to breaking in a new streetbike. One is that all the various bearings and other internals with mating surfaces need sufficient low-load and low-rpm running time to bed in. High spots on bearing surfaces and other machining imperfections can cause increased friction and excess heat until this happens, so some period of light duty is required. The second consideration is the seal between the piston rings and the cylinder wall. While this area is also subject to high spots and requires some light running time, more important is the long-term seal between the two. A good ring/cylinder seal keeps the compression ratio to what the

manufacturer intends, stops combustion gases getting into the crankcase, oil getting into the combustion chamber, and in general provides better performance and fuel economy. Higher loads during break-in put more pressure on the rings to improve the sealing characteristics of the piston rings.

Advocates of the hard break-in are usually looking for this tight engine seal for good performance and are not so concerned with the long-term aspects. This might be fine for a racebike that will be rebuilt every season but not so good for your ZX-6R, which will hopefully last you many years without that kind of attention. Most manufacturers give similar break-in guidelines to what you cited for your Kawasaki, with varying rpm and mileage limits, though 4,000 rpm is on the low side compared with most that I've read. The owner's manual for a new Yamaha YZF-R6, for example, lists 8,300 rpm to 600 miles and 9,900 rpm to 1,000 miles, and it says that you should avoid prolonged operation above those numbers. The Honda CBR600RR manual says simply to avoid full-throttle starts and rapid acceleration in the first 300 miles.

The conflict is that for a good break-in you

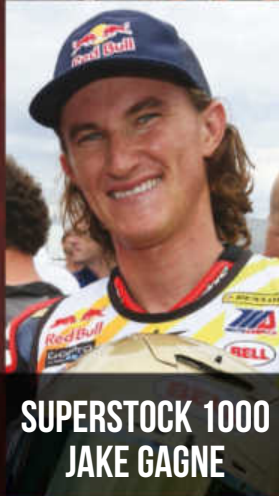
want low-load, low-rpm running for those mating surfaces that need it, but at the same time you want higher loads to generate cylinder pressure and a good ring seal. With all this in mind, we've always recommended the manufacturers' procedures but with some additional guidelines: Always warm your bike up for at least several minutes before riding away. This ensures the oil is up to temperature and flowing freely, minimizing the chance of damaging those high-friction mating surfaces. Avoid any use of full throttle or lugging the engine, and don't rev the engine in neutral or run it for extended periods with no load or very heavy load. Essentially, you want to put varying loads on the engine during break-in but not excessively so; this means no freeway droning and no stop-and-go traffic but instead riding that calls for changing rpm, speed, and throttle—it's a good excuse to stick to the twisties for the first 1,000 miles.

Some occasional bursts to increasingly higher rpm and load with some hard pulls to redline at the end of the process will ensure that the rings get sealed. And most importantly, be sure to have the oil changed as per your owner's manual at 1,000 miles, the end of the break-in process. **SR**



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PHOTOS: GOLD & GOOSE

“Hey! Aren’t you supposed to be my teammate?” Jack Miller (43) scuttles his LCR Honda teammate Cal Crutchlow (35) at the British Grand Prix.





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Corsair-V (left) vs. Corsair-X (right)

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